Acronym of the project	**re-Connect**
Titre du projet (en français)	Institut Audition Cognition
Proposal's title (in English)	Institute for Hearing and Auditory Cognition

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1. BIOGRAPHICAL SKETCH OF THE PROJECT LEADER

1.1. BIOGRAPHICAL SKETCH OF THE IHU DIR., PR. ANNE-LISE GIRAUD

LAST NAME	CURRENT POSITION (title, location)
GIRAUD (MAMESSIER)	Professor Auditory Neuroscience
First name	Director of Institut de l'Audition
Anne-Lise	Head of Pasteur/Inserm Unit AO06 (UA06)
Date of Birth	Institut de l'Audition 63, rue de Charenton
18/12/1968	75012 Paris

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR OBTAINED	FIELD OF STUDY
UPMC – Paris - France	Habilitation	2006	Neuroscience
UCBL- Lyon- France	PhD.	1997	Neuroscience
UCBL- Lyon- France	M.Sc	1992	Neuroscience
UCBL- Lyon- France	Eq Bachelor	1990	Biochemistry
UCBL- Lyon- France	B.A.	1986	Maths & Physics

Positions and employment

2013 – 2021 **Full professor** (Professeure Ordinaire), Neuroscience Department, Medical faculty, University of Geneva (UNIGE), Switzerland
2008 – 2013 **Research Director** CNRS (DR2), Inserm U960, École Normale Supérieure, Paris
2004 – 2008 **Permanent Researcher** (CR1), Inserm U742, École Normale Supérieure, Paris
2003 – 2004 **Invited Professor**, Département d'Études Cognitives, École Normale Sup., Paris
2002 – 2004 **Leader** of the Auditory Language Group, Frankfirt Brain Imaging Centre, Germany
1999 – 2002 **Post-doctoral Scientist**, Phys. Institute III, Frankfurt Goethe University, Germany
1997 – 1999 **Post-doctoral scientist**, Wellcome Dept. of Imaging Neuroscience, UCL, UK

Current Research Support

2021 – 2024 NCCR Personnal grants SNSF (circa 2M)
2020 – 2023 National Centre of Competence in Research Evolving Language (co-director) 34MCHF.
2020 – 2023 Wilsdorf foundation (co-applicant): MEG and 7T MRI scanners (20MCHF)

Other selected completed research projects of significance

2019 – 2021 SNSF Subside d'Excellence (850 kCHF)
2017 – 2019 Wyss Center, Individual project (Dyslexia; 750 kCHF)
2017 – 2021 European Commission, Future and Emerging Technologies (1M€), total 8M€
2016 – 2020 Wyss Center + HUG Fundation (MEG scanner 1MCHF)
2011 – 2015 European Research Council (Starting Grant, consolidator level, 1.5 M

Selected Peer-reviewed Publications and Patents

Total number of peer-reviewed publications	Total number of citations	Total number of patents
108*	14208	2 invention statements

*including 2 highly cited papers (web of science)

The five most relevant and important publications

🏆 *highly cited papers (web of science)*

1. Cross-modal plasticity underpins language recovery after cochlear implantation, **Giraud, A-L.**, Price, C. J., Graham, J. M., Truy, E., et Frackowiak, R. S., *Neuron*, (2001). 30(3), 657-663. doi: https://doi.org/10.1016/S0896-6273(01)00318-X.

This study in profoundly deaf patients with cochlear implants demonstrates for the first time the importance of cross-modal plasticity during deafness, in particular the recruitment of visual associative cortex, in auditory rehabilitation after cochlear implantation. This paper initiated a shift in post-implantation rehabilitation practices from a purely auditory focus to the use of audiovisual percepts.

2. 🏆Cortical oscillations and speech processing: emerging computational principles**. Giraud A-L.** & Poeppel D. **(**2012). *Nature neuroscience.* 15(4),511-517. doi: 10.1038/nn.3063. **>1500 citations**

3. Endogenous cortical rhythms determine cerebral specialization for speech perception and production**. Giraud, A-L.**, Kleinschmidt, A., Poeppel, D., Lund, T. E., Frackowiak, R. S., & Laufs, H. *Neuron*, (2007), 56(6), 1127-1134. doi:10.1016/j.neuron.2007.09.038

These two publications raise the question of the computational principles that can be operated by auditory neural oscillations in the context of speech processing, and in particular in hierarchical phonological processing. The theoretical proposal is that phonemes are encoded in part by the place they occupy in a syllable cycle through the embedding of high and low frequency neural activity. Paper 2 is the most cited paper in the field.

4. 🏆 Cortical oscillations and sensory predictions. Arnal L., **Giraud A.L**. **2012**. Trends in Cognitive Sciences, 23:37-42. **>1000 citations**

This article reviews the neurophysiological basis of predictive coding, a highly influential theory in neuroscience, with an emphasis on the role of low-level auditory oscillatory mechanisms. By synthesizing a multitude of experimental results on this topic, this article provides a comprehensive overview of the canonical mechanisms and pathways underlying the asymmetric propagation of exogenous (bottom-up) and anticipatory (top-down) information flows in the human brain.

5. Selective enhancement of low-gamma activity by tACS improves phonemic processing and reading accuracy in dyslexia. Marchesotti S., Nicolle J., Merlet I., Arnal L.H., Donoghue J.P., **Giraud A-L.** *PLoS Biology*, (2020). 18(9), e3000833. doi: 10.1371/journal.pbio.3000833.

This paper questions the causal role of neural oscillations in speech processing and investigates the consequences of an auditory dysfunction of the gamma rhythm. By showing that transcranial alternative current stimulation (tACS) can restore correct gamma activity and improve phonemic perception and reading accuracy, the findings establish a direct causality between altered gamma activity in the auditory cortex and phonological processes. From a clinical point of view, these results constitute the proof of concept that improving reading in dyslexic individuals is possible by directly intervening on the activity of the auditory cortex.

6. Proix T, Delgado Saa J, Christen A, Martin S, Pasley BN, Knight RT, Tian X, Poeppel D, Doyle W, Devinsly O, Arnal L, Mégevand P, **Giraud AL 2021**. Imagined speech can (also) be decoded from low- and cross-frequency features. Nature Communications, 13(1):48. doi: 10.1038/s41467-021-27725-3.

This paper is the first milestone in the development of a brain-machine interface that should help people who have lost the ability to speak as a result of neurodegenerative damage or acute brain or spinal cord injury. We have identified with ECoG data the most promising features for use in future decoding devices. Although most attempts have been made using high gamma neural activity as the main feature for overt speech decoding, we show here that lower frequencies, such as low gamma, low theta and low beta, as well as some cross-frequency features offer equally powerful or even better possibilities for covert speech decoding.

Book: **Giraud, A. L.**, *Le cerveau et les maux de la parole*, éd. Odile Jacob, Paris, 2018.
Ouvrage grand public, faisant état de l'avancée des recherches en Neurosciences dans le domaine des maladies de la parole (surdité, aphasie, autisme, bégaiement, dyslexie etc.).

Patents/Invention

2015 Invention disclosure (Unitec, Unige): tACS stimulation in dyslexia (Giraud, A-L).
2021 Invention disclosure (Unitec, Unige): A home-based device of the treatment of dyslexia (Marchesotti, S., Arnal, L., Giraud, A-L.)

Prizes and Awards

2011 CNRS – Prime d'excellence Scientifique
2018 Fonds National Suisse – Subside d'excellence

Previous pedagogic activities

2016 – 2021 Medical studies, Bachelor (3rd Year), Neuroscience module, APP, Medical faculty, UNIGE (20h)
2020 – 2021 Biomedical Studies, Bachelor (2nd and 3rd Year), Auditory system, Medical faculty, UNIGE (5h)
2016 – 2021 The auditory system. Master in Neurosciences, Medical Faculty, UNIGE (4h/year)
2020 – 2022 NCCR-Evolving Language PhD programme (20h)
2014 – 2021 Optional course 2nd & 3rd years of medical studies, UNIGE, Genève. (25h)
2014 – 2021 Auditory Neuroscience. Lemanic doctoral school of neuroscience (6h)
2012 – 2021 Introduction to cognitive neuroscience: neurophysiology of speech processing (3h). Master of Neuroscience, UNIGE, Genève
2010 – 2011 Teaching in clinical audiophonology (4h), UNIGE, Genève. Recent advances in cochlear implant research
2004 – 2010 Annual teaching in:
Master Cognitive Sciences (ENS-EHESS-Polytechnique): Auditory perception
Master Neuroscience (Paris VI): Neuropsychology of speech perception.
Master 2 Neuroscience (Lyon I): Mechanisms of cortical plasticity after auditory deprivation and rehabilitation
2003 – 2004 Participation in the creation of Cogmaster (ENS-EHESS, Ecole Polytechnique, Paris VI).
Teaching in Master in Neuroscience, Lyon (UCBL). Mechanisms of cortical plasticity after auditory deprivation and rehabilitation.
1994 – 1997 Physiology practical course (50 h/year). 1rst and 2nd years of medical studies. Université Claude Bernard Lyon I (UCBL)

Previous administrative responsibilities

Previous Institutional activities (past 5 years)

2020 – 2023 Co-director of the National Centre of Competence in Research Evolving Language https://www.evolvinglanguage.ch/
2015 – 2020 Coordination of the UNIGE Language and Communication Network
2016 – 2022 Member of Platform Advisory Committees - Campus Biotech Geneva.
2019 – 2022 Member of the Section of fundamental medicine - UNIGE / facmed
2018 – 2020 Member of the task force for the revision of medical studies - UNIGE / facmed
2008 – 2012 Head of Inserm Team – LNC – ENS – Paris.

Participation in Academic evaluation (past 5 years)

As member of academic panel for professorship nomination:
Dimitri Van de Ville: assoc. P. (EPFL, CH)
Mary Rudner: full P (U Linköping, Sweden)
Roman Sztajzel: assoc. P (Med, Unige, CH)
François Lazeyras: assoc. P (Med, Unige, CH)
Philippe Millet: ass. P (Med, Unige, CH)
Emeline Bolmont: ass. P (Astroph., Unige, CH)
Pascal Oesch: full P. (Astroph. Unige, CH)
Torsten Meling: full P (Med., Unige, CH)
Valentina Borghesani. asst. P (Psych., Unige, CH)
N.N ass. P Neuroscience (Med., Unige, CH)
N.N ass P Molecular Anthropology (UZH, CH)

As head of panel:
Camilla Bellone: associate prof. (UNIGE, CH)

Organization of Scientific Meetings (Past 5 years)

2020 – 2022 Summer school of the NCCR-Evolving Language (150 participants)
2013 – 2020 Annual Alpine Brain Imaging Meeting (ABIM), Champéry, Switzerland (300 participants)
2016 LOC of the Human Brain Mapping conference, June 26-30, Geneva, Switzerland (3000 participants)
2014 Cortical oscillations and predictive coding workshop (SNF funding), Feb.11-13, Campus Biotech Geneva (50 participants)
2017 Brain rhythms and cortical computations workshop, October 5-6, Biotech Campus Geneva, Switzerland (50 participants)
2018 Speech perception and workshop (with Jean-Luc Schwartz, CNRS-GIPSA UGA Grenoble, France) January 28-30, Biotech Campus Geneva, Switzerland (60 participants)

Other Responsibilities

Co-founder of Brain Rhythms and Cortical Computations international network (2012-prés).

Peer reviewing for circa 40 international journals (incl. Nature, Science, Neuron, Nature neuroscience, PNAS, PLoS Biology, etc.), and 15 research agencies (incl. ERC, ANR, NHS, NIH, Wellcome Trust etc.).

Member of the editorial advisory board of 4 international scientific journals (Neuroimage Clinical, Neuroscience and language Cognition, Neuroscience, JARO)

Member of the scientific advisory board of research institutes (Neurospin Inserm-CEA, Gif-sur Yvette, France; Brain and Language Institute, Marseille, France; Institut Language, Communication and the Brain, Université Aix/Marseille, France)

Member of the scientific advisory board of the Linguistic Research Infrastructure (LiRI), University of Zurich, Switzerland.

1.2. BIOGRAPHICAL SKETCH OF DEPUTY DIR., PR. CLAIRE PAQUET

LAST NAME	CURRENT POSITION (title, location)
PAQUET	Full Professor of Neurology
First name	University Paris-Cité
Claire	Hôpital Lariboisière
Date of Birth	2 rue Ambroise Paré
01/04/1972	75010 Paris

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR OBTAINED	FIELD OF STUDY
Université Paris Cité - France	Habilitation	2015	Neuroscience
Université Paris Cité - France	PhD	2011	Neuroscience
Sorbonne U. - Paris - France	DES* - neurology	2009	Medicine
Sorbonne U. - Paris - France	Master 2	2003	Medicine
University of Rouen - France	DES*	2004	Atomic Physics
University of Rouen - France	MD	2004	Physics

*DES. Diploma of Specialized Medicine

Positions and employment

2016 – **Professor**, Université Paris Cité, Paris
2008 – 2015 **Neurologist** full time
2007 – 2008 **Assistant professor** in Neuropathology
2004 – 2006 **Assistant professor** in Neurology

Selected Peer-reviewed Publications and Patents

Total number of peer-reviewed publications	Total number of citations	Total number of patents
167	6455	2

The two most relevant and important publications

1. A Pragmatic, Data-Driven Method to Determine Cutoffs for CSF Biomarkers of Alzheimer Disease Based on Validation Against PET Imaging.Dumurgier J, Sabia S, Zetterberg H, Teunissen CE, Hanseeuw B, Orellana A, Schraen S, Gabelle A, Boada M, Lebouvier T, Willemse EAJ, Cognat E, Ruiz A, Hourregue C, Lilamand M, Bouaziz-Amar E, Laplanche JL, Lehmann S, Pasquier F, Scheltens P, Blennow K, Singh-Manoux A, & **Paquet C,** Alzheimer's Disease Neuroimaging Initiative, Neurology, (2022). 16, 99(7):e669-e678.

2. Effect of active A? immunotherapy on neurons in human Alzheimer's disease. **Paquet C**, Amin J, Mouton-Liger F, Nasser M, Love S, Gray F, Pickering RM, Nicoll JA, Holmes C, Hugon J, Boche D., (2015). The Journal of Pathology, 235(5), 721-30.

Prizes and Awards

2021 Chevalière de la Légion d'Honneur (Highest French honorific distinction)
2016 Price of Fondation de la Brou de Laurière
2013 Price Philippe Chatrier
2003 Prize of Société Française de Neurologie
1995 Prize of Foreign Training in Debrecen Hungary

Previous pedagogic activities

2017 – Head of the Histology Department, Faculty of Medicine, University Paris-Cité
2015 – Head of Lumbar Puncture Teaching, Faculty of Medicine, University Paris-Cité

Previous administrative responsibilities

Organization of Scientific Meetings (Past 5 years)
Lewy Body Dementia Colloque in Paris 2018, in Marseille 2021, in Paris 2022
National congress of Histology in Paris 2016

Previous Institutional activities (past 5 years)
2021 – Scientific Referent for the French Ministry of Health and Prevention
2019 – Elected President of the Medical Committee of the Lariboisière Hospital
Member of the Teaching Committee, Université Paris-Cité
2017 – Director of the Department of continuous medical education of Medical University, University Paris-Cité
Elected Member of the Central Committee of Medical University, University Paris-Cité
Head of the Cognitive Neurology Center, Lariboisière Hospital
2017 – 2019 Member of the Scientific Committee of the University Paris Diderot
2013 – 2015 Elected Member of the National Committee - Fédération des Centres Mémoires

Participation in Academic evaluation (past 5 years)
2021 – President of the Scientific Committee of the Fondation Vaincre Alzheimer
2017 – Member of the European Scientific Committee for the European Commission
2017 – 2020 Vice-President of the Scientific Committee of Fondation Vaincre Alzheimer
2017 – 2021 Member of the Scientific Committee of France Alzheimer
2017 – 2019 Member of the Scientific Committee, Université Paris Diderot

1.3. BIOGRAPHICAL SKETCH OF DEPUTY DIR., PR. EMMANUEL MANDONNET

LAST NAME	CURRENT POSITION (title, location)
MANDONNET	Professor of Neurosurgery
First name	University Paris Cité
Emmanuel	Hôpital Lariboisière
Date of Birth	2 rue Ambroise Paré
30/03/1973	75010 Paris

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR OBTAINED	FIELD OF STUDY
UPMC - Paris - France	Habilitation	2010	Medicine
UPD - Paris - France	Specialist Qualification	2008	Neurosurgery
UPMC - Paris - France	Medical Thesis	2006	Medicine
UPD - Paris - France	Medical Degree	2003	Medicine
UPMC - Paris - France	PhD thesis	2000	Atomic Physics
ENS - Lyon - France	BS and MS	1998	Physics

Positions and employment

2018 – **Principal Investigator - Contrat Interface Inserm**, Frontlab, Paris Brain Institute (ICM), Paris
2015 – **Consultant neurosurgeon**, Lariboisière Hospital, Paris
Professor, Université Paris Cité, Paris
2008 – 2015 **Consultant neurosurgeon**, Lariboisière Hospital, Paris
Associate Professor, Université Paris Cité, Paris
2003 – 2007 **Resident in neurosurgery,** University Paris 6
Researcher, University Paris 6
2003 – 2007 **3 years training, non-resident doctor**, Hospital Necker-Enfants Malades

Research Interest: **Glioma:** awake surgery, brain mapping, resection probability maps, neuropsychological outcome, machine learning; **Brain functional networks:** multimodal anatomo-functional correlations, axono-cortical evoked potentials, computational modeling of brain electrical stimulation, brain computer interface

Selected Peer-reviewed Publications and Patents

Total number of peer-reviewed publications	Total number of citations	Total number of patents
161*	9537	1

*including 1 highly cited paper (web of science)

The two most relevant and important publications:

1. Electrically induced verbal perseveration: A striatal deafferentation model. **Mandonnet, E**., Herbet, G., Moritz-Gasser, S., Poisson, I., Rheault, F. & Duffau, H., Neurology, (2019). 92(6):e613–e621, doi: 10.1212/WNL.0000000000006880

2. Network-level prediction of set-shifting deterioration after lower-grade glioma resection. Mrah, S., Descoteaux, M., Wager, M., Boré, A., Rheault, F., Thirion, B. & **Mandonnet, E**. Journal of Neurosurgery, (2022). Mar 4:1-9, doi: 10.3171/2022.1.JNS212257

Book: **Mandonnet, E.**, & Herbet, G. (Eds). Intraoperative mapping of cognitive networks: which tasks for which locations, Springer, Cham, Switzerland, 2021.

Patents/Invention

2015 patent number: 9026195, Method for characterizing the development of pathologies involving changes in volumes of bodies, notably tumors.

Current Research Support

2021 – 2025 ANR Cog-Toolkit, vers de nouveaux outils digitaux pour la prise en charge cognitive des patients cérébro-lésés (350 k€), Principal investigator
2021 – 2023 ANR X-Fatigue, Better understand, detect and treat mental fatigue (461 k€), co-investigator
2021 – 2024 ARC NeurElectroPhys(in)surgery, co-investigator
2021 – 2025 ANR MICBrainPres, Apprentissage machine en imagerie de connectivité, co-investigator

Prizes and Awards

2009 Prix Jean Valade

Pedagogic activities

2015 – 2019 Coordinator of the neuroscience learning module (UE 25), Master 1 BCPP, Paris Diderot University
Previously. International courses in glioma surgery and white matter functional anatomy

2. TEAM SKILLS AND EXPERTISE

WP	Team name	Team Leader or Member	Impact of publications			Awards or distinction received in the last 10 years	Number of Patents filled over the last 10 years	Average annual revenues raised (from start-up creation, license revenues, public funds) (over the last 5y)
			Number of publications	Number of citations	Max IF on top publications (over last 5y)			
WP1	Institut de l'Audition - CeRIAH	Avan, Paul	170	7500	14.8	National Academy of Medicine, elected corresponding member	2	300 k€
	Hôpital Lariboisière - Department of Otolaryngology - Head and Neck Surgery	Hautefort, Charlotte	94	1958	28	-	-	-
	Hôpital Rothschild - Department of Otolaryngology - Head and Neck Surgery, CRIC	Mamelle, Elisabeth	17	497	9.7	-	-	-
	Hôpital Necker Enfants-Malades - Department of Otolaryngology -Head and Neck Surgery	Simon, François	167	993	8.96	-	-	-
	Institut de l'Audition, PSDPT	El Amraoui, Aziz	82	8320	19.6	Chaire Charles Nicole, Institut Pasteur, 2017	-	300 k€
	Institut de l'Audition, PSDPT	Delmaghani, Sedigheh	15	2172	12,8	-	2	-
	Necker Hospital - Pediatric Otolaryngology Department and Research Center in Pediatric Audiology	Denoyelle, François	183	4354	21	-	-	190k€
	Necker Hospital - CREA	Loundon, Nathalie	122	1690	5,1	-	-	-
	Necker Hospital - CREA	Rouillon, Isabelle	44	923	3,3	-	-	-
	Fondation Rotschild – service ORL	Levy, Daniel	5	5	7.046	-	-	-
	Fondation Rotschild – service ORL	Ayache Denis	80	1404	4,514	-	-	-
	CEFON	Toupet, Michel	92	508	4	Légion d'Honneur décernée par l'Académie des Sciences	-	-
	Hôpital Lariboisière – Service de Neuroradiologie	Eliezer, Michael	65	822	11,8	-	-	-
	Hôpital Lariboisière - Centre de Référence et d'Éducation aux Antithrombotiques d'Ile de France, Service de cardiologie	Drouet, Ludovic	230	4275	16	-	-	90k€
	Hôpital Lariboisière - Internal medicine department	Champion, Karine	14		51	-	-	-
	Hôpital Lariboisière	Sène, Damien	244	5891	31	-	-	14 k€

WP2	Institut de l'Audition - IThA	Petit, Christine	371	36576	20	9 international prices including the Neuroscience Kavli prize, the Grand Prix Inserm, FR National Acad. of Sci., US National Acad. of Sci. and Acad. of Medicine, Norway National Acad. of Sci.	5	2100k€
	Institut de l'Audition - TGTD	Nguyen, Yann	90	1924	8.9	-	3	100k€
	Institut de l'Audition – DCT	Etournay, Raphael	15	577	17.6	3 articles awarded by Faculty Opinions (formerly F1000 Prime) for 'special significance in its field'	-	150 k€
	CEA/DRF/IBFJ - CNRGH (National Center of Research in Human Genetics); CEPH (Centre d'Etude du Polymorphisme Humain)	Deleuze, Jean-François	362	19360	42	CNRGH Scientific director; CEPH Director; Senior Fellow of CEA	5	3400k€
	Institut Pasteur - Statistical Genetics	Aschard, Hugues	100	6229	41.4	-	-	350k€
	Hôpital Pitié-Salpêtrière - Department of Otolaryngology –Head and Neck Surgery	Lahlou, Ghizlene	38	405	13.3	Prix émergence scientifique – Fondation pour l'Audition (2022)	1	47.5k€
	Institut de l'Audition - TGTD	Safieddine, Saïd	40	1852	14	-	4	1200k€
	Institut de l'Audition - TGTD	Dulon, Didier	83	4050	17	-	1	30k€
	Institut de l'Audition - TGTD	Ferrary, Evelyne	279	5341	6.5	-	-	45k€
	Institut de l'Audition - CNSA	Barral, Jérémie	14	742	24.88	Prix Jeunes Chercheurs de la fondation Bettencourt-Schueller	-	110k€
	IRBA	Andéol, Guillaume	28	341	5	-	-	300 k€
	Université de Rennes, Plateforme Protim	Pineau, Charles	97	9878	15	President of the Human Proteome Project	5	1500k€
	Institut de la Vision - Gene therapies and animal models for neurodegenerative diseases	Dalkara, Deniz	163	5784	41.58	-	-	-
WP3	CNRS - Dynamique Neuronale et Audition	Norena, Arnaud	67	5379	5.04	Prix émergence scientifique – Fondation pour l'Audition Best article of the month in Journal of Neurophysiology	3 (invention statements)	100 k€
	Hôpital Européen Pompidou HEGP - Department of Otolaryngology –Head and Neck Surgery	Londero, Alain	71	2400	3.5	-	-	-
	Institut des neurosciences Paris-Saclay, Neural code & auditory perception	Edeline, Jean-Marc	92	5495	12.57	-	-	115 k€
	Institut de l'Audition - PCAC	Gourévitch, Boris	42	1786	8	-	-	20k€
	Hôpital Hôtel-Dieu - Department of Psychiatry	Lemogne, Cédric	213	4402	79	-	-	150 k€
	Harvard Medical School - Department of Otolaryngology - Head and Neck Surgery	Maison, Stéphane	31	3809	202	Singer-Polignac Foundation Award; Philippe Foundation Award	1	300 k€
	Université de Lille	Samson, Séverine	142	7420	11,5	Légion d'honneur	-	114k€
	Institut de l'Audition – EXPLOSNS & CeRIAH	Thai-Van, Hung	84	1724	4.996	Trophée Bref Eco Innovation Auvergne Rhône Alpes	2	30k€
	IRCAM, CNRS, SU, Acoustic and Cognitive Spaces, STMS	Hobeika Lise	13	231	4,37	-	-	-

WP3	IRCAM, CNRS, SU, Acoustic and Cognitive Spaces, STMS	Viaud-Delmon, Isabelle	79	2188	5,13	-	-	-
	IRCAM - UMR STMS	Warufsel, Olivier	122	2560	4,37	Prix Chavasse (2013) Société Française d'Acoustique		130k€
	Hôpital Lariboisière - Neuroradiology	Houdart, Emmanuel	246	15981	53	-	-	-
	Amplifon, France	Buisson Savin, Johanna	9	271	3.16	-	-	-
	Hôpital Lariboisière - Cognitive Neurology Center	Roos, C	17	491	8	-	-	-
WP4	Hôpital Lariboisière - Cognitive Neurology Center	Paquet, Claire	148	6394	21.56	Prix Fondation Philippe Chatrier ; Prix Fondation de la Brou de Laurière ; Légion d'Honneur	2	250 k€
	Institut de l'Audition - PCAC	Michalski, Nicolas	21	1614	12.3	Prix émergence scientifique – Fondation pour l'Audition	-	270k€
	Hôpital Lariboisière - Cognitive Neurology Center	Mouton-Liger, François	44	1490	8.99	Prix World Mitochondria Society	1	114 k€
	Hôpital Lariboisière - Cognitive Neurology Center	Dumurgier, Julien	123	2508	93	Philippe Foundation Award; Servier Foundation Award	1	60 k€
	Hôpital Lariboisière - Cognitive Neurology Center	Mazighi, Mickaël	254	14070	60.8	Prix de la Fondation de l'Avenir	5	1000 k€
	Hôpital Lariboisière - Cognitive Neurology Center	Lilamand, Matthieu	47	448	11.1	Prix Journées Françaises HyperTension Artérielle	-	20 k€
	ICM - Laboratory of Structural Plasticity	Renier, Nicolas	29	4374	41.58	Prix de thèse, Société Française des Neurosciences; Prix Young Investigator, Federation of European Neuroscience Societies	-	622 k€
	Lyon Neuroscience Research Center - Brain reality (IMPACT team)	Macaluso, Emiliano	130	9584	6.6	-	-	40 k€
	Institut Pasteur - Integrative Neurobiology of Cholinergic Systems	Maskos, Uwe	94	43	53	Prix Duquesne	1	500k€
WP5	Hôpital Lariboisière - Department of Neurosurgery	Mandonnet, Emmanuel	158	9270	12.3	Prix Jean Valade	1	100 k€
	Institut de l'Audition - ACC	Lazard, Diane	37	1842	12	The Faculty of 1000: top 2% of published articles in biology and medicine; Prix Duval-Marjolin, Acad. de Chirurgie : meilleure thèse de chirurgie, Prix Politzer	-	50 k€
	Institut de l'Audition - Neurospeech	Bouton, Sophie	8	294	9.5	Humanities and Social Sciences Award (CNRS), 2020	-	100 k€
	Institut de l'Audition - Neurospeech	Giraud, Anne-Lise	66	14266	17,8	-	2 (Invention statements)	700 k€
	ICM - PICNIC Lab	Cohen, Laurent	64	49543	13	-	2	120 k€
	ICM - Dynamics of Epileptic Networks and Neuronal Excitability	Lehongre, Katia	38	1976	28	-	-	-
	ICM - Dynamics of Epileptic Networks and Neuronal Excitability	Navarro, Vincent	125	4293	13,3	FFRE grant on NORSE	2	300k€
	UPC - LaPsyDe	Altarelli, Irene	19	1107	23.4	-	-	100 k€

WP5	UPS - Neurophysiologie respiratoire expérimentale et Clinique	Gatignol, Peggy	46	3675	8.56	-	-	40k€
	Institut de l'Audition, - NeuroSpeech, EPS Barthélémy Durand	Vinurel, Mariette	-	-	-	-	-	69 k€
	ICM - Neurogénétique fondamentale et translationnelle	Borel, Stéphanie	25	376	3.46	-	-	-
	Centre de Recherche en Épidémiologie et Santé des Populations, UMR 1018, Université Paris-Saclay (« Psychiatrie du Développement et trajectoires")	Speranza, Mario	37	236	12.38	-	-	1000 k€
	Goethe University, Frankfurt - Department of Neurology and Brain Imaging Center	Kell, Christian	46	3086	34.87	Prize for exceptional commitment to teaching 2019	1	170 k€
	CEA – Neurospin, Cognition & Brain Dynamics	van Wassenhove, Virginie	56	6670	25	Coordinatrice DIM C-BRAINS (2022-26); Ordre du mérite (2022-23)	1	150 k€
WP6	Institut de l'Audition, DSAPM	Bathellier, Brice	50	1741	24.8	Bronze Medal (CNRS); Foulon Prize (Institut de France)	-	710 k€
	Institut Pasteur - Decision and Bayesian Computation	Masson, Jean-Baptiste	60	~2800	48	12 prices, including: Prix Innovateurs île de France 2022; 3 Laval virtual prix: startup, healthcare, Grand prix 2022; concours d'innovation i-NOV vague VII 2021; Prix Start-ULM 2018	3 and 5 APP for software	1000 k€
	CEA – Inria – MIND (Models and Inference for Neuroimaging Data)	Thirion, Bertrand	316	76609	69	-	-	-
WP6	GeodAIsics	Attyé, Arnaud	141	1539	7.2	Olea Innovations Awards, 2018; Young Researcher award, French Society of Radiology, 2014	1	220 k€
	CEA – Inria – MIND (Models and Inference for Neuroimaging Data)	Gramfort, Alexandre	283	77965	24.8	Prix de l'innovation de l'académie des Sciences, 2019	1	50 k€
	Université de Nancy - Multispeech, Loria	Serizel, Romain	86	1788	9.19	-	-	300 k€
	Université de Nancy – SyNaLP, Loria	Cerisara, Christophe	122	1043	6.9	-	-	150k€
	Université de Nancy – Sémagramme, Loria	Amblard, M	155	351	3,5	-	-	150k€
	Institut de la Vision - Visual information processing: neural coding and vision restoration	Chalk, Mark	17	783	12,5	-	-	100k€
	Institut de l'Audition - Data acquisition and signal processing facility	Dussaux, Clara	5	132	48	-	-	-
WP7	Institut de l'Audition - ACC	Arnal, Luc	29	3188	14.9	Prix émergence de la Fondation pour l'Audition	-	170k€
	myBrain Technologies	Attal, Yohan	14	963	5	18 International Awards	4	10 000 k€
WP8	Fondation Pour l'Audition	Marie-Josée Duran	54	428	6.421	-	-	-
WP9	AudioCampus Montpellier - Inserm U1298	Puel, Jean-Luc	49	3867	9,5	Médaille AFCM - Prix Jean Bayle-Lespitau» Fondation de l'Avenir, Trophées 2022; Scientific Grand Prize for hearing research. Fondation de l'Audition 2016; Price "Espoir en Tête" FRC-Rotary International, 2013	1	600k€

3. WORKPACKAGES AND MILESTONES

3.1. WORKPACKAGES

WP N°	WP acronym	WP Description	Start month	End month	WP Leader
WP 1	SFAV management	To build the tools allowing Sudden and Fluctuating AudioVestibular (SFAV) patients to be diagnosed, treated and monitored in emergency and post-emergency contexts	M1	M120	*Hautefort, Charlotte* *Avan, Paul*
WP 2	EARinTherapy	Preventing and curing progressive hearing loss: age-related and noise-induced forms	M1	M120	*Petit, Christine* *Nguyen, Yann*
WP3	AuPerDi	Better understanding and treating Auditory Perception Disorders	M1	M120	*Norena, Arnaud* *Londero, Alain*
WP4	HEADD	Hearing and Dementia: an intertwined relationship	M1	M120	*Paquet, Claire* *Michalski, Nicolas*
WP5	APD	Audio-phonological disorders: meet the growing demand for treatment	M1	M120	*Mandonnet, Emmanuel* *Lazard, Diane*
WP6	DataScience	Provides state-of-the-art computational tools for diagnosis, quantification and prosthesis encoding	M1	M120	*Bathellier, Brice* *Masson, Jean-Baptiste*
WP7	CoReMed	Connected Research and Medicine	M1	M120	*Arnal, Luc* *Attal, Yohan*
WP8	Prevent	To improve the prevention of hearing and speech disorders in France	M1	M120	*Duran, Marie-Josée* *Avan, Paul*
WP9	Train&Com	New continuous training & university programs – Communication	M1	M120	*Bathellier, Brice* *Thai-van, Hung*
WP10	Innov4Patient	To bring innovation to the patients thanks to industrial partnerships, licence or start up creation	M1	M120	*Pelletier-Bressac, Isabelle* *Buckle, Isabelle*
WP11	X-Frontiers	To maintain the level of excellence and novelty in research throughout IHU lifetime	M1	M120	*Lodeho-Devauchelle, Anne-Dominique* *Quinsac, Céline* *Oficjalska, Danuta*

3.2. MILESTONES

We have indicated the milestones for the first 5 years of the project in black, but given the scale of the project, we have also indicated the milestones for the 10 years of the project in grey.

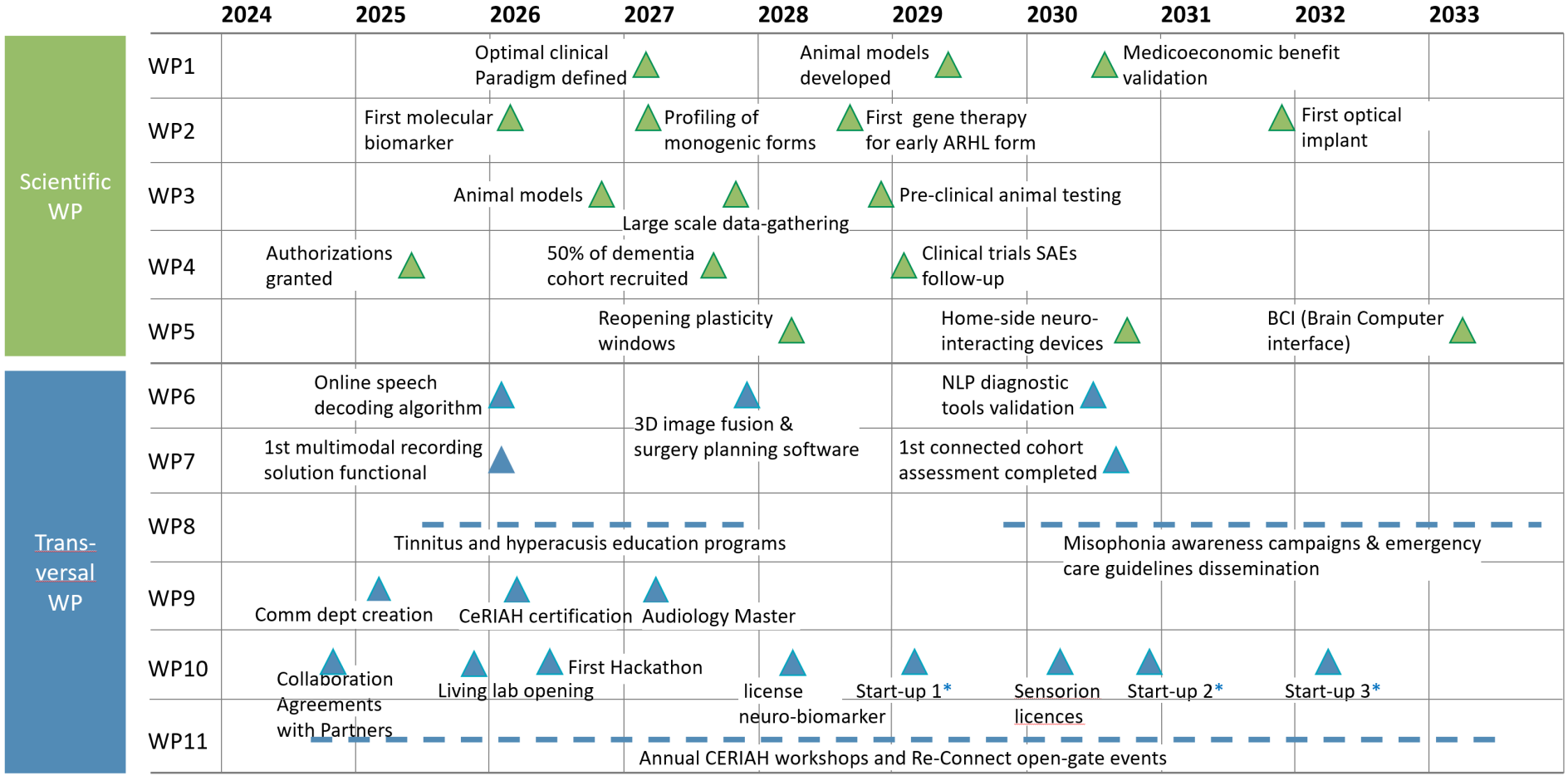
Milestone N°	Milestone name	Expected year of completion	Proposed means of verification
WP1.1	Validation of an optimal clinical testing paradigm	Y3	Sensitivity and specificity measures for exemplar patients
WP1.2	Results of anti TNFa and microvascular trials in exemplar patients	Y5	Ability to inhibit new attacks of sudden hearing loss (SFAV)
WP1.3	Validation of tablet driven equipment for mobile testing	Y6	Same results as those obtained using standard equipment
WP1.4	Ability for new biomarkers to reliably identify the mechanism of sudden hearing loss in all patients	Y6	Successful treatment along the same line as exemplary patients, now based on biomarker-based diagnosis
WP1.5	Animal models with distinctive pathophysiological mechanisms emulating the different forms of sudden hearing loss.	Y7	Similar symptoms and evolution of sudden hearing loss (SFAV)
WP2.1	Setting-up clinical in-depth hearing/vestibular characterization Patient cohorts for NIHL and ARHL	Y1 Y2-3	Implementation in patient recruitment centers Biobanking of samples completed
WP2.2	Causal or protective human genes for early-onset ARHL Predisposing or protective genetic factors for NIHL and early-ARHL Candidate biomarkers for chronic or traumatic noise exposure in mouse models. Validation of biomarkers in humans	Y3 Y4 Y4 Y5	Identification of 3 to 7 genes Identification of 10 to 30 predisposing genes Identification of 6 - 10 candidate biomarkers Benchmarking the performance of the biomarkers
WP2.3	Development of mouse models for early onset ARHL First gene therapy for a congenital deafness form	Y3 Y5	POCs for an innovative approach evaluated through the generation of at least 3 mouse models Significant evidence from the mouse models
WP2.4	Determination of the optimal route and technique of administration Development of safe method: therapy administration and perilymph sampling Control drug diffusion to the central nervous system	Y3 Y5 Y7	POC in animal models and temporal bone POC in a series of patients POC in a series of patients, patent deposit
WP2.5	Optimal targeting strategy for optical implantation Benefits of the optical implant versus the electrical cochlear implant	Y5 Y8	Physiological and behavioral tests in animal models validated Comparative study completed

WP3.1	Virtual Reality for treating misophonia	Y5	Results of a clinical trial
WP3.2	Validation of genetic models for high threshold fibers	Y2	Functional and molecular characterization of auditory nerve subtypes in the models
WP3.3	Identification of key prognosis factors predicting the onset of auditory perception disorders after hearing loss	Y5	Validation of the prognostic tool using a large cohort of patients (n > 200): Identification of tasks with prognostic value
WP3.3	Development of an app to monitor sound environment and track the evolution of symptoms	Y8	Identification of the key behavioral features to measure in the app
WP4.1	Complete the recruitment of patients to the cohort	Y3	Number of patients recruited in each cohort
WP4.2	Fine characterization of auditory deficits in patient cohorts	Y5	Longitudinal analysis to determine whether there is a correlation between, different forms of hearing loss and dementia severity
WP4.3	Characterization of neuronal biomarkers in the auditory system	Y8	Group and longitudinal analysis of Alzheimer markers in patient cohorts
WP4.4	Validation of humanized mice for Alzheimer's disease	Y3	Characterization of brain deficits in mice transduced with human neurons from Alzheimer's patients
WP4.5	Role of the auditory cerebrovascular system	Y8	Group analysis to determine the link between auditory cerebrovascular deficits, hearing loss and dementia severity
WP4.6	Characterization of cerebrovascular deficits in mouse models of hearing loss	Y3	Characterization of three types of deafness: congenital, progressive and auditory neuropathy
WP4.7	Clinical interventions	Y9	Determining whether hearing aids and sonic interventions prevent/delay dementia symptoms in our cohorts
WP5.1	re-opening neuroplasticity in deaf patient	Y5	Group analysis to disentangle the benefits of the 4 stimulation methods
WP5.2	Home-side neuro-interacting device for dyslexics	Y7	Group analysis to evaluate the impact of the proposed training
WP5.3	Validation of prognostic tool for ASD patients	Y3	Longitudinal analysis to determine whether the prognostic tool provides clinical benefits
WP5.3	Home-side neuro-interacting device for ASD patients	Y6	Group analysis to evaluate the impact of the proposed training
WP5.4	Brain Computer Interface (BCI) - device	Y10	Sensitivity and specificity measures for exemplar patients
WP6.1	Medical image analysis pipeline: 3D image fusion for inner ear radiology	Y4	All medical images saved on the data management platform will be automatically analyzed with results checked by medical doctors

WP6.2	Software for hearing implant surgery planning	Y4	Prospective medical study to test the protocol and use the fusion algorithms on the robotic application
WP6.3	Online speech decoding algorithm Software platform to turn EEG into speech	Y3 Y7	2 phases test: 1 on research staff to benchmark performance, then medical study on patients
WP6.4	Software for diagnosis assistance Validation of NLP tools for diagnosis	Y6	Benchmark tests on patient cohorts non-used for algorithm training
WP6.5	Software for hearing aids in neuropathies	Y8	Benchmark tests on patient cohorts non-used for algorithm training
WP6.6	Encoding model for primate/human cortical implant	Y7	Benchmark tests of the software
WP6.7	Functional data management process	Y1	Server space & data management wiki
WP7.1	Online recruitment platform	Y2	Online recruitment operational
WP7.2	Connected devices data streaming	Y3	Multimodal dataset acquisition completed
WP7.3	Multimodal device integration	Y5	Dataset synced from multiple devices
WP7.4	Hospital-based autonomous use of platform	Y6	Connected cohort assessment completed
WP8.1	Dissemination of emergency care guidelines for sudden and fluctuating deafness (SFAV)	Y10	Disseminated material
WP8.2	Presbycusis prevention and lobbying for hearing screening	Y10	Disseminated material
WP8.3	Dissemination of the therapeutic patient education program for tinnitus and hyperacusis and awareness about misophonia	Y10	Disseminated material
WP8.4	Hearing loss, a modifiable risk factor for the development of dementia	Y10	Disseminated material
WP8.5	Promoting early screening of impaired reading skills and dyslexia in children	Y10	Disseminated material
WP9.1	Audiology master & continuous training for clinicians	Y4	Courses
WP9.2	Hearing Science training for university students	Y1-Y10	Courses
WP9.3	Online videos & podcasts for the general public by the Re-Connect communication department	Y2	Disseminated media
WP9.4	Communication with patient associations	Y1-Y10	Communication material
WP9.5	Scientific communication	Y10	Published articles and seminars schedules
WP9.6	CeRIAH Mobile training with certification	Y3	Certification procedure
WP10.1	Technology Transfer: licenses revenues and start-up creation	Y1-Y10	At least 10 patent applications, at least 5 licenses agreements, 3-5 start-ups

WP10.2	Liaison Office organization	Y1	Recruitment done
WP10.3	Academic (APHP-IP) Sponsor Trials	Y1-Y10	Clinical trials started
WP10.4	Living Lab	Y2-3	Opening and launch of the first hackathon
WP11.1	CeRIAH workshops, re-Connect open-gate event organization	Y1-Y10	Hackathons organized
WP11.2	Biannual cross – WP meetings	Y1-Y10	Meetings reports
WP11.3	Manage and support the unexpected	Y1-Y10	Internal grants awarded
WP11.4	Fundraising	Y1-Y10	Raised funds

3.3. HIGH-LEVEL 10-YEAR ROADMAP :



*Start-up 1: Application tinnitus/hyperacusis / Start-up 2: internet of things (IOT) / Start-up 3: Home-based neurostimulation

Figure 1: *Macro-Milestones by Workpackage*

4. SWOT ANALYSIS

reConnect Strengths	Weaknesses
1. Addressing one of the World's major health challenges (hearing impairment being 7th most important cause of disability) 2. World-class team of Academics with proven track records in both fundamental and clinical research 3. Renowned and committed funding members including leading private and public institutions (e.g., Fondation pour l'Audition, APHP, Institut Pasteur, Inserm) 4. Direct access to large existing pools of patients at 2 leading Parisian University hospitals (Lariboisière & La Pitié-Salpêtrière) with ability to have concrete impact on patients' quality of life 5. Existing research labs and functional exploration platforms within Institut de l'Audition that allow to kickstart the project, not having to wait for new site on Lariboisière campus 6. Existing administrative structure within Institut de l'Audition, backed by Institut Pasteur (e.g., research valorization teams)	1. Important investments needed to sustain forefront research programs (e.g., genomic platform, imagery platform, functional exploration labs) 2. Difficulty to attract sizeable private donations given lower community awareness and emotional appeal than other diseases (e.g., oncology)

Ecosystem's Opportunities	Ecosystem's Threats
1. Large adjacent fields of research with significant remaining unmet medical needs 2. Possible future convening role as the European center of excellence for auditory research 3. Ability to structure academic trainings at National level and reinvent existing curricula for both initial and continuing education 4. Growing R&D investments from industrial players, especially in the field of IoT and connected medicine	1. Uncertain macro-economic context that may impair public partners' financial leeway 2. Public clinicians and researchers' mobility to private sector

5. INVOLVEMENT IN "INVESTMENTS FOR THE FUTURE" AND NATIONAL PROGRAMS

5.1. INVESTMENTS FOR THE FUTURE PROGRAM / FRANCE 2030 PLAN

Category	WP	Name of the project & duration (start & end date)	Name of the partner/ team involved	Grant Budget (k€)
Investissements d'avenir	WP2	RHU Audinnove (2020-2025)	Saaid Safieddine (TGTD-IdA) Christine Petit (IThA-IdA)	4319

5.2. NATIONAL PROGRAMS

Category	WP	Sub-category	Name of the project & duration (start & end date)	Name of the partner/ team involved	Grant Budget (k€)
European Grants	WP3/6	ERC CoG	Deepen (2018-2023)	Brice Bathellier (DSAMP-IdA)	2000
	WP3/6	FET Open	Hearlight (2021-2025)	Brice Bathelllier, Nicolas Michalski, Jérémie Barral (DSAMP, PCAC, CNSA-IdA)	698 (3000 for the EU consortium)
National Grants	WP2	ANR	ANR2021-SelfMorphogEar (2022-2025)	Raphael Etournay (PCAC-IdA), Mireille Montcouquiol (Institut Magendie, Bordeaux), Guillaume Salbreux (Geneva University)	322 (556 for the consortium)
	WP1/2	ANR/DFG	Presage (2021-2025)	CeRIAH - IThA	250
	WP2	ANR	ANR2021 TympaBiom (2022-2026)	Yann Nguyen (TGTD-IdA), Florence Agnely (Université Paris Saclay)	50 (476 for the consortium)
	WP2	ANR	ANR2017 Murocs (2017-2023)	Yann Nguyen (TGTD-IdA), Laurent Tavernier (CHU Besançon)	105
	WP2	ANR	ANR2019 Robocop (2019-2024)	Yann Nguyen (TGTD-IdA), Gang Zheng (Inria Lille)	152
	WP2	Programme régional	DIM-Elicit-CystEar (2020-2022)	Raphael Etournay (PCAC-IdA), Samy Gobaa and Nathalie Aulner (Institut Pasteur)	299
	WP2	Programme régional	DIM-Therapie Génique (2017-2021)	Saaid Safieddine (TGTD-IdA); Christine Petit (IThA-IdA)	600
	WP2	Programme régional	PTR-OrganoEar (2019-2022)	Raphael Etournay (PCAC-IdA), Régis Grailhe (Institut Pasteur Korea), Samy Gobaa (Institut Pasteur)	230
	WP4	ANR	ANR-2021-VAMPHEARS	Nicolas Renier (ICM, Paris)	564
			(2021-2025)	Nicolas Michalski (PCAC-IdA)	
	WP5	ANR	ANR2020 - LabCom - XFatigue	Emmanuel Mandonnet (Larboisiere)	350
			ANR2022-MicBrainPres		70
			ARC-2021-NeurElectroPhys(in)surgery		130
	WP5	PHRC, inter-régional	PHRC (Programme hospitalier de recherche clinique) - I (2022 - 2027)	Mariette Vinurel (NeuroSpeech-IdA)	302

National Grants	WP5/WP7	ANR	ANR-Per2Prod (2021-2024)	Sophie Bouton (NeuroSpeech-IdA)	390
	WP3/WP6	ANR	ANR-AudioDream (2022-2026)	Brice Bathellier (DSAMP-IdA)	197 (600 for consortium)
	WP1/WP6	ANR	Refined (2021-2026)	Gourevitch (PCAC-IdA), Avan (IdA/CeRIAH), Auzanneau (CEA), Serizel (LORIA)	199 (646 for consortium)
Foundation Grants	WP1	FRM	Grant FRM (2019-2022)	Uwe Maskos (Integrative Neurobiology of Cholinergic Systems, IP)	395
	WP2	FPA	Cochlear development and therapeutic perspectives (2019-2024)	Raphael Etournay (DCT-IdA)	300
	WP2	FPA	Technologies and Gene Therapy for Deafness (2019-2024)	Saaid Safieddine (TGTD-IdA)	300
	WP4	Charity Donation	Action on Hearing Loss and Alzheimer UK foundations	Nicolas Renier (ICM, Paris) Nicolas Michalski (PCAC-IdA)	150
	WP5	FPA	Auditory Cognition and Communication (2019-2024)	Diane Lazard (ACC-IdA)	150
	WP7	FPA	Auditory Cognition and Communication (2019-2024)	Luc Arnal (ACC-IdA)	650
	WP3	Grant FPA	Pathophysiology, psychoemotional and cognitive functioning associated with tinnitus	Séverine Samson (PI, Université de Lille), Alain Londero (HEGP)	299
	WP3	Grant FFRE	Surgical treatment of temporal lobe epilepsy and tinnitus	Séverine Samson (Univ Lille)	50
	WP4	Fondation Spelberg, Fondation Université de Paris, Alzheimer, de France, CRC, FVA, AMCL, ANR	Multimodal exploration of demented patients (2022-2024)	Claire Paquet (APHP)	1350
	WP5/WP7	Fyssen	BodyLang (2019-2022)	Sophie Bouton (NeuroSpeech-IdA)	35
	WP2/WP3	FPA	Neural coding in the auditory system (2019-2024)	Jérémie Barral (CNA-IdA)	800
	WP7/WP9	FPA	Auditory System Dynamics and Multisensory Processing (2019-2024)	Brice Bathellier (DSAMP-IdA)	1200
	WP8/WP9	FPA	Clinical and translational exploration of sensorineural hearing loss (2019-2024)	Hung Thai Van (EXPLOSNS-IdA)	250
	WP1/WP8	FPA	Center for innovation in human audiology (2019-2024)	Paul Avan (CeRIAH)	250
	WP1	FPA	Progressive Sensory Disorders, Pathophysiology and Therapy (2019-2024)	Aziz El Amraoui (DSP-IdA)	500
	WP4	FPA	Plasticity of central auditory circuits (2019-2024)	Nicolas Michalski/ Boris Gourevitch (PCAC-IdA)	400
	WP2	FPA	Auditory therapies innovation laboratory (2019-2024)	Christine Petit (IThA-IdA)	650
	WP5	FPA	Neural coding and neuroengineering of speech functions (2022-31)	Anne-Lise Giraud (NeuroSpeech-IdA)	3053

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7. OTHER INFORMATION IF CONSIDERED RELEVANT

7.1. INFRASTRUCTURES, TECHNOLOGICAL FACILITIES AND CERIAHS

Existing Resources. Re-Connect relies on a new 4,500 sq.m research infrastructure, the Institut de l'Audition (IdA) that opened in 2020 (https://www.institut-audition.fr/en). Situated in central Paris, the IdA hosts 10 fundamental and preclinical research teams, 3 technological platforms and an innovation center, the Center for Research and Innovation in Human Audiology or **CeRIAH-Bench**, which runs audiology research protocols on large human cohorts. The latter is fully equipped for audiometry and electrophysiology and is staffed with researchers, physicians, engineers and clinical coordinators. The IdA **Bioimaging Platform** is equipped with cutting edge light and electron imaging tools enabling explorations from whole organs to intracellular structures, but also the manipulation of cells via optogenetics. It offers help and advice for sample preparation and acquisition, processing, analysis and interpretation of images. The **Phenotyping Platform** standardizes the phenotypic characterization of mouse and gerbil models of auditory and vestibular disorders. It offers equipment, training, and expertise close to animal housing. The **Data acquisition and signal processing Platform** develops specific analysis tools for multimodal (multidimensional) research data, and maintains high standards in the analysis of imaging, electrophysiology and behavioral experiments.
Re-Connect will set up **new Facilities** on the Lariboisière Hospital site where an additional infrastructure of about 5000 m^2 will be allocated by APHP, in the context of the staged restructuration of the entire hospital site. Before the attribution of this space, the IHU will rely on extra free space at IdA, the Day Hospital at Lariboisière that already gathers Neurology and ENT, the current experimental surgery space, the existing MRI platform, and space within the biochemistry section for genomics/proteomics. In the context of the Lariboisière site restructuration, reConnect will be endowed either constructible space for a new building at the north-western end of the campus (Hypothesis A), or within two connected historic buildings (Hypothesis B) (see Building Annexe). Note that the funding for the new building or historic building renovation is not settled yet, even though potential sponsors (Région île de France, Ville de Paris, Caisse des Dépôts et Consignations) have already been solicited for financial support. Irrespective of the exact landing, the new structure will be conceived as an integrative environment including scientific, technical, and clinical expertise, facilities for our industrial partners and start-ups, and an infrastructure adapted to our training program. The translation of preclinical (reConnect-IdA) to clinical research (reConnect-Larib) will be made via the extension of CeRIAH-Bench to a twin structure, the **CeRIAH-**

bedside (Fig 2), whose mission is threefold: 1) Transform the patient's care pathway: the localization within a large hospital centralizing ENT emergencies is ideal to set-up novel pathways involving quick diagnosis for fast drug administration when necessary (WP1-3); 2) Coordinate ReConnect clinical research: owing its expertise in medicine, clinical coordination, science and engineering, as well as its cutting-edge equipment (in audiology but also in human sample collection), the CeRIAH-bedside will be the central platform for all the clinical projects of our research and industrial teams; 3) Spread innovations via the CeRIAH mobile unit (WP10) to other clinical sites in France. To achieve fast genetic assessment, diagnosis and biomarkers characterization and detection, reConnect will rely on a new dedicated **Proteomics and genomics facility,** equipped with last generation sequencers and mass spectrometers. Many of the patients involved in the proposed research protocols and clinical trials will have to undergo structural and/or functional neuroimaging (cochlea + brain), some of whom will eventually also undergo neurostimulation and Brain Computer Interface (BCI) experimental treatments. A **Neuroimaging facility** will be set up and equipped with a PET-MRI machine, BCI and neurostimulation tools (tD/ACS). To enable secure and standardized data storage accessible to large scale computational analysis, a **Data management facility** will be set up in collaboration with the Institut Pasteur and APHP data management services. Finally, to develop new surgical approaches, prototypes of surgical (robotic, virtual reality) tools for minimally invasive solutions and to simulate new surgical procedures, an **Experimental surgery platform** will also be set-up with 15 surgery stations data storage. It will offer space for training skilled surgeons and for collaboration with external teams and companies. All platforms will be open to academics and industry on a fee-for-use basis, which will in the longer run generate visibility and income. ReConnect will also coordinate research with **Privileged Partners,** notably with CREAs, which are FPA-funded research platforms located at Hôpital de la Pitié-Salpêtrière (adults) and Hôpital Necker-Imagine (children), and partner structures, such as the Reference Center for Genetic Deafness (Necker-Imagine), the ICM, and the Institut de la Vision-Foresight. Note that the IdA being part of the Brain&Mind biocluster proposal (under evaluation), reConnect is meant to join this cluster should both be funded.

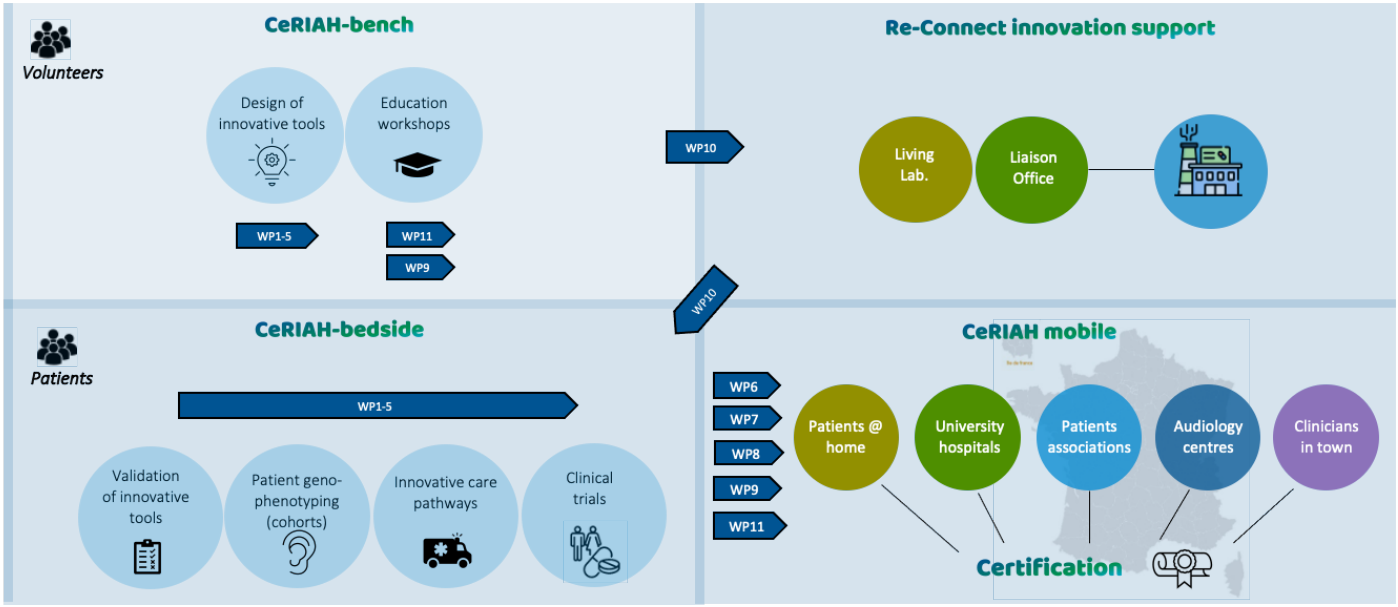
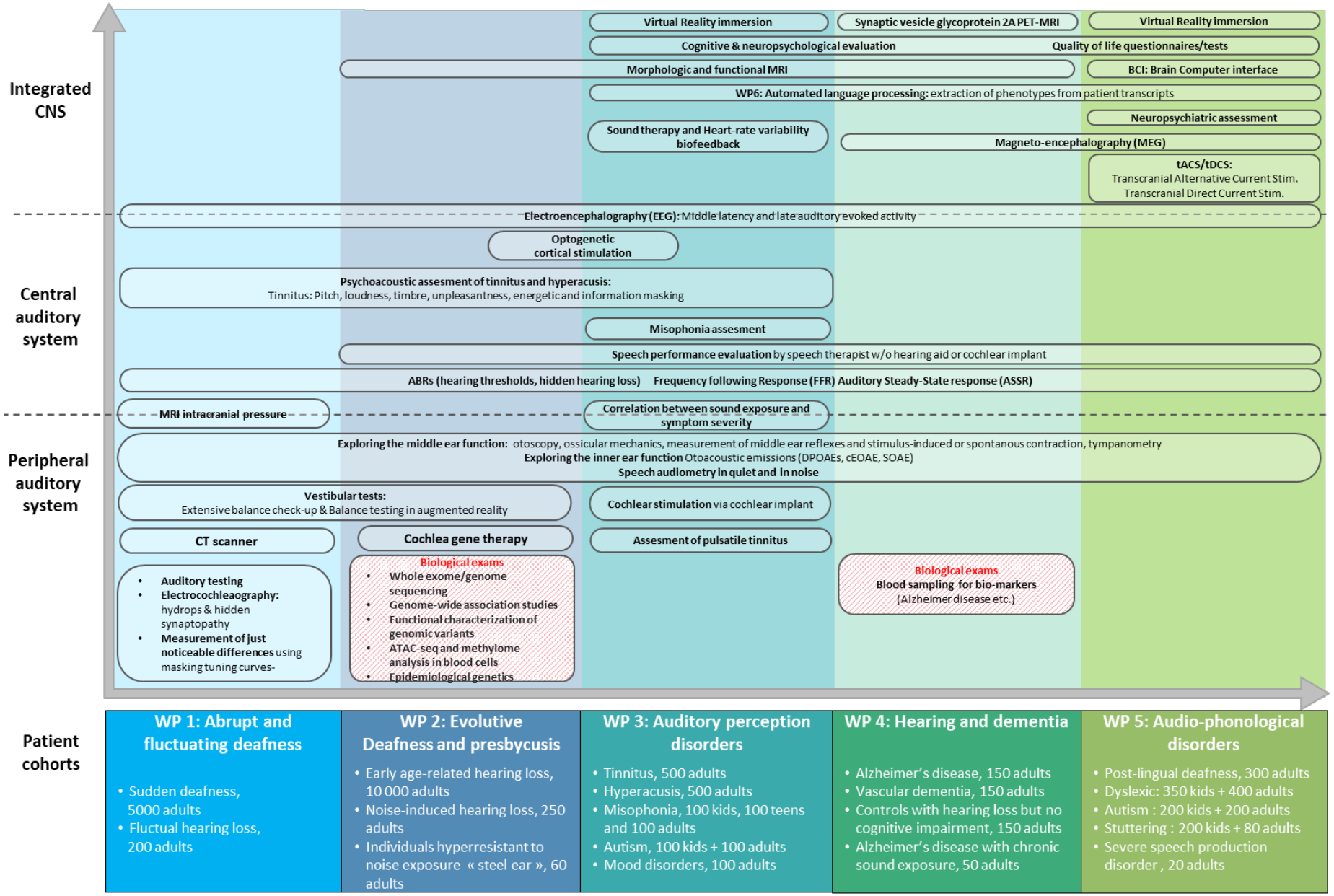


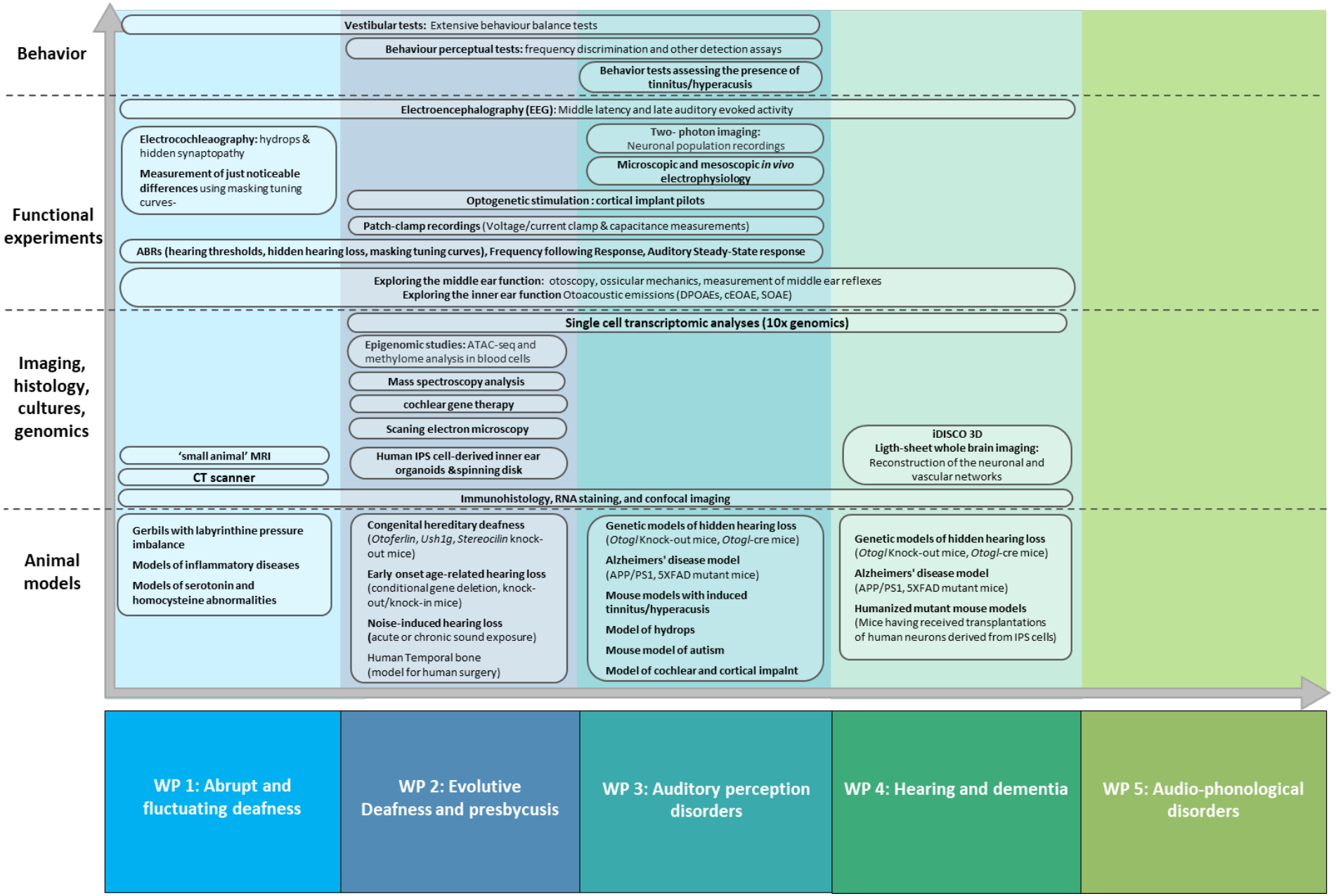
Figure 2: *Articulation of the CeRIAH organs within the IHU and with the national network.*

7.2. METHODS AND TECHNOLOGIES

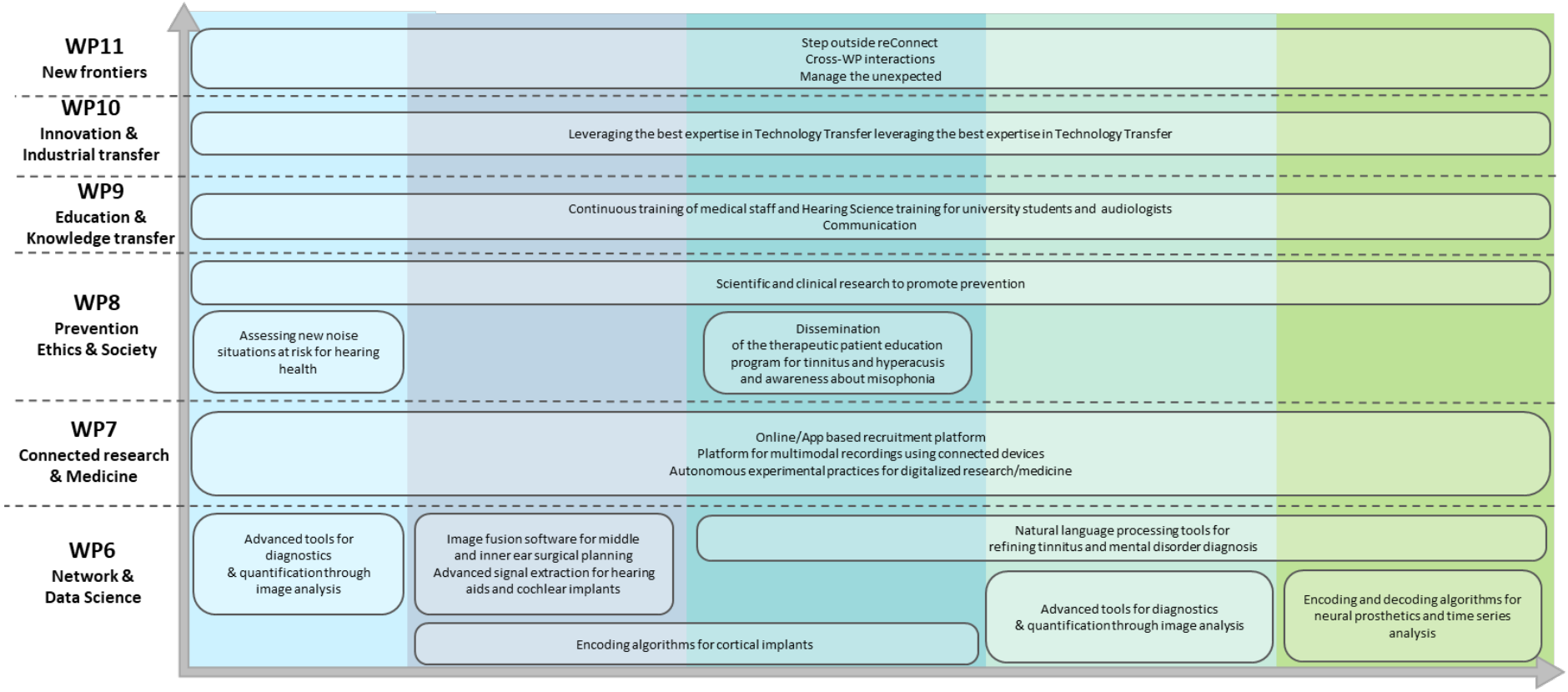
7.2.1 Human Studies



7.2.2 Animal Studies



7.3. CROSS-FERTILIZATION SCIENTIFIC WP / TRANSVERSAL WP



Patient cohorts

WP 1: Abrupt and fluctuating deafness	WP 2: Evolutive Deafness and presbycusis	WP 3: Auditory perception disorders	WP 4: Hearing and dementia	WP 5: Audio-phonological disorders
• Sudden deafness, 5000 adults • Fluctual hearing loss, 200 adults	• Early age-related hearing loss, 10 000 adults • Noise-induced hearing loss, 250 adults • Individuals hyperresistant to noise exposure « steel ear », 60 adults	• Tinnitus, 500 adults • Hyperacusis, 500 adults • Misophonia, 100 kids, 100 teens and 100 adults • Autism, 100 kids + 100 adults • Mood disorders, 100 adults	• Alzheimer's disease, 150 adults • Vascular dementia, 150 adults • Controls with hearing loss but no cognitive impairment, 150 adults • Alzheimer's disease with chronic sound exposure, 50 adults	• Post-lingual deafness, 300 adults • Dyslexic: 350 kids + 400 adults • Autism : 200 kids + 200 adults • Stuttering : 200 kids + 80 adults • Severe speech production disorder , 20 adults

New

CERIAH-Bedside (clinical trials/patients)
Platforms: Experimental surgery, Genomics/proteomics, Neurostimulation & Imaging (PET-MRI, BCI)
Multimodal data management

Existing

CERIAH-Bench (clinical trials/volunteers) **IDA - Preclinical research**
Platforms: Animal phenotyping, Bioimaging, Signal processing

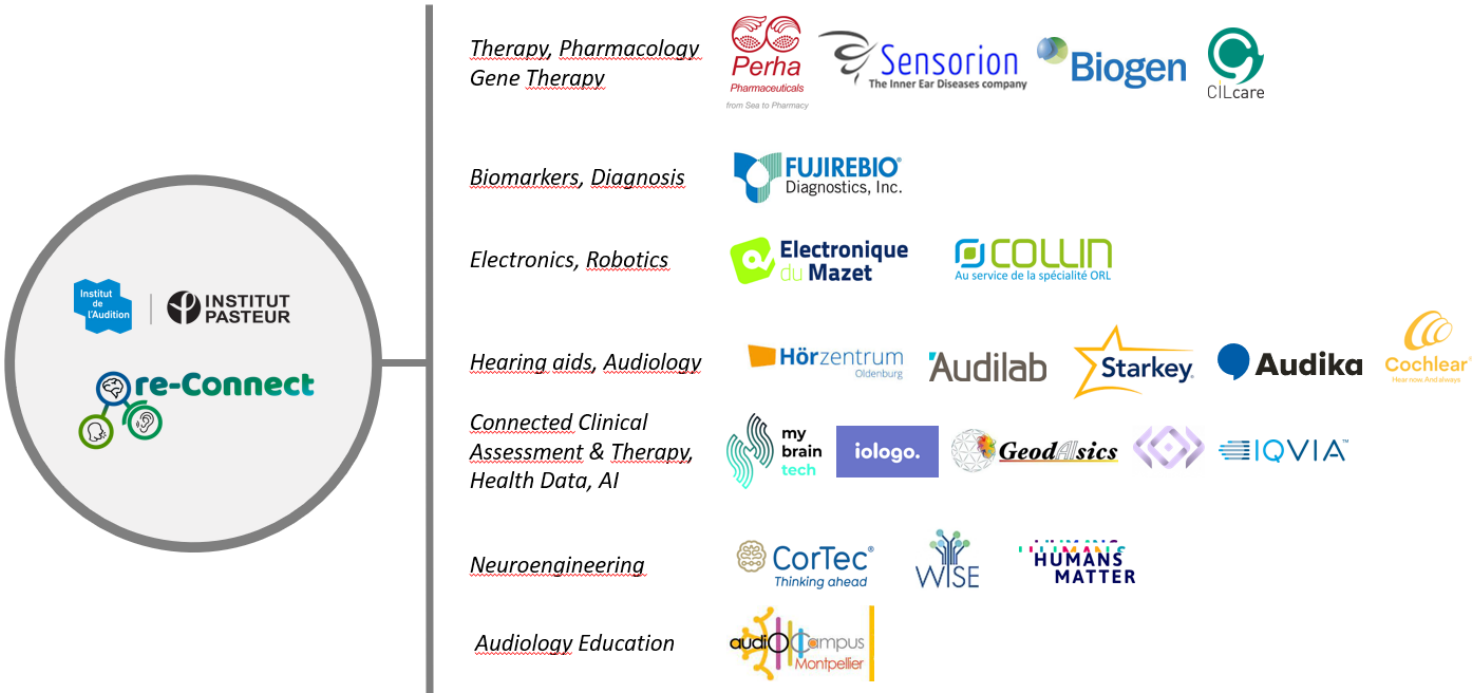
7.4. INNOVATION COMMITTEE

The Innovation Committee is a strategic advisory body to the Management Board made of the executive Director, a representative of each Founders empowered in IP and innovation matters ("Founder Representatives"), and the Liaison Officer. The Innovation Committee is chaired by the Executive Director.
The Founders grant the mandate to the Institut Pasteur as "Mandataire Unique" according to the existing Master agreements or under signature between the Institut Pasteur and the Founders, except clinical IP addressed by Founders as sponsor of the clinical trials. The Innovation Committee will ensure compliance with the principles of non-competition between the Founders, transparency and guarantee clear and accessible information to researchers on the transfer mechanisms, ensuring the harmonious application of the IP rules defined between the Founders. It provides advice for the creation of start-ups and the acquisition of stakes taking into account the IHU as well as the maturation programs.
The Innovation Committee is informed by the Liaison Officer of projects with a high potential of developability. Its role is:

- To supervise the application of the rules related to the equal sharing of IP between the Founders and the third parties involved; No co-ownership for re-Connect on the IP in the absence of a legal personality; re-Connect will be interested in revenue income. The teams behind the IP may have a right for research excluding any use for commercial purposes; The Founders appoint the Institut Pasteur as "Mandataire Unique" that bears all the IP costs, and reimburses itself for the costs thus incurred before distributing the license income ; the "Mandataire Unique" ensures the distribution of the income between the co-owners in order for them to pay their inventors; The Mandataire Unique for clinical IP will be the Founders sponsor of the clinical trials.
- To notify Founders representatives of patent filings arising from re-Connect;
- To inform the Founders representatives of the actions taken for licensing the patents, of key results of re-Connect and of strategic partnerships with the industry.
- To issue to the Management Board any recommendations it deems relevant on IP and commercialization strategies related to re-Connect results.
- In the event of a dispute over authorship or inventorship, to study and issue recommendations on the authorship or inventorship of the re-Connect results to the Management Board
- To issue opinions on publication or communication projects
- To issue any relevant recommendation in the event of a party wishing to abandon or assign IP title to a Re-Connect result.

The Innovation Committee meets on a bimonthly basis as well as at any other time for one or more specific reasons, at the request of the Steering Committee or the Coordinator (the Institut Pasteur) or the Management Board.
An annual report is drafted by the President of the Innovation Committee with the support of the Liaison Officer and submitted to the Management Board.

7.5. INDUSTRIAL CO-DEVELOPING PARTNERS



7.6. TABLE OF SUPPORT LETTERS

7.6.1. Table of support letters

n°	Companies /Entities	Nationality	Business
LOI-1	**Académie de Médecine***	**France**	Institution
LOI-2	**Agi Son**	**France**	Association, sound management
LOI-3	**Amplifon**	**France**	Medical devices: Implant or Protheses
LOI-4	**APHP Assistance Publique - Hôpitaux de Paris***	**France**	Institution
LOI-5	**Argobio**	**France**	Start-up studio, cutting-edge innovations
LOI-6	***Audika***	**France**	Medical devices: Implant or Protheses
LOI-7	**Audilab**	**France**	Medical devices: Implant or Protheses
LOI-8	**AudioCampus Montpellier***	**France**	Institution, Research, Education
LOI-9	***Avatar****	**France**	Imaging
LOI-10	***BIOGEN****	**France/US**	Therapeutic, Pharma
LOI-11	**Bucodes**	**France**	Association
LOI-12	**Cap Digital***	**France**	Pole of Competitivity
LOI-13	**CIDB Centre d'Informations sur le Bruit**	**France**	Association
LOI-14	***Cilcare***	**France**	Contract research org, preclinical services
LOI-15	**CNRS**	**France**	Institution
LOI-16	***Cochlear***	**Australia**	Medical devices: Implant or Protheses
LOI-17	**Collège National d'Audioprothèse**	**France**	Association
LOI-18	***Collin****	**France**	Medical devices: robot
LOI-19	***Cortec Neuro****	**Germany**	medical devices: Implant or Protheses

LOI-20	**Devialet***	**France**	Audio material
LOI-21	***Electronique Du Mazet***	**France**	Equipment
LOI-22	**Essilor***	**France**	Medical devices: Implant or Protheses
LOI-23	**FISAF - Fédération Nationale pour l'Insertion des Sourds et Aveugles de France**	**France**	Association
LOI-24	**France Acouphènes**	**France**	Association
LOI-25	***Fujirebio****	**France/Japon**	Diagnostics in vitro
LOI-26	***GeodAIsic***	**France**	Digital
LOI-27	***Horzentrum Oldenburg****	**Germany**	Institution
LOI-28	***Humans Matter****	**France**	Digital
LOI-29	**IDV Institut de la Vision – IHU ForeSight***	**France**	Institution, Research, Education
LOI-30	**Iologo**	**France**	Teaching tools
LOI-31	**IQVIA***	**France/US**	CRO
LOI-32	**La Semaine du son**	**France**	Association
LOI-33	**Medicen***	**France**	Pole of Competitivity
LOI-34	***MyBraintech****	**France**	Digital
LOI-35	***MyMedical Assistant***	**France**	Digital
LOI-36	**Natus**	**US**	Medical devices: diagnistics
LOI-37	***Perha pharma****	**France**	Pharmaceutics
LOI-38	**Région Ile de France***	**France**	Institution
LOI-39	**Roche***	**France**	Pharmaceutics
LOI-40	**Royal National Institute for Deaf people**	**England**	Charity
LOI-41	**SDA Syndicat des Audioprothésistes**	**France**	Union
LOI-42	***Sensorion****	**France**	Biotech
LOI-43	**Service de Santé des Armée***	**France**	Institution, Research
LOI-44	**Société Médecine du Travail Ouest Île-de-France**	**France**	Association
LOI-45	***Starkey****	**US**	Medical devices: Implant or Protheses
LOI-46	**Surdi Info Service***	**France**	Association
LOI-47	**SYNEA - Syndicat National des Entreprises de l'Audition***	**France**	Union/Association
LOI-48	**Unamines**	**France**	Union
LOI-49	**Ville de Paris***	**France**	Institution
LOI-50	**Wise SRl***	**Itlay**	Digital, Medical devices

* See Excerpts of these letters in *7.6.2*
All support letters received are available here
re-Connect Industrial partners (*are in **italic**)*

7.6.2 27 Excerpts from 50 support letters

Reference: IHU re-Connect
Folder Followed by: Benjamin Boutot
Email : bboutot@medicen.org

Anne-Lise GIRAUD-MAMESSIER
Institut de l'audition
63 Rue de Charenton
75012 Paris
FRANCE

Paris October 28th, 2022

SUPPORT LETTER TO THE RE-CONNECT PROJECT

The Project Evaluation Committee of Medicen Paris Region, which includes academic researchers, clinicians from university hospitals and industry representatives (SMEs and large companies) which met on October 26th, 2022 is pleased to inform you of the full support of Medicen Paris Region to the re-Connect project, submitted to the "Institut Hospital-Universitaire" (IHU) third round call from the Programme d'Investissements d'Avenir 4 (PIA 4).

The IHU re-Connect project addresses several major national public health issues around hearing health: 1 in 6 people suffer from hearing loss, hearing impaired patients suffer from a lack of diagnosis and adequate treatment, escalating noise pollution leads to increased auditory and extra-auditory morbidity. re-Connect includes several short and long-term core projects targeting innovative auditory and neuronal therapies: ear genetic and cellular therapy, sono/opto-genetics for cochlear implants, robotics for reliable delivery of therapeutic vectors to the inner ear, optogenetic cortical implants for the treatment of central auditory disorders, the combination of sound therapy and chemotherapy to limit the progression of Alzheimer's disease and cortico-informatic vocal and neurostimulation interfaces for communication disorders. The creation of the IHU re-Connect will bring together for the first time the main stakeholders in hearing health with the aim of fostering innovation and entrepreneurship..

This project is led by several highly recognized academic teams and companies: Anne-Lise Giraud-Mamessier, Director of the Hearing Institute, an Institut Pasteur center, Nawal Ouzren, CEO of Sensorion, Sebastien Ailleret, CEO of Electronic DuMazet, Yohan Attal, CEO of MyBraintech, Arnaud Ayttier from Geodaisics, Laurent Mejer, CEO of Perha Pharma, Laurent Julien, CEO of Iologo, Nicolas Prevos, CEO of Collin Medical, Laura Vernoux,, Scientific Affairs manager for Fujirebio, Olivier Bärtl, CEO of Cortec Neuro, Fabrice Vigneron General Manager of Starkey, Saskia Vulliez, International Sales Director at Natus, Jörg-Hendrik Bach, head of R&D at Hörttech Gmbh and Julie Bestel, Scientific coordinator of Audilab.

re-Connect is a transdisciplinary project which addresses three strategic R&D areas (Translational Medicine, Diagnostic and Interventional Imaging and ICT for health) of Medicen Paris Region.
The strong expertise of the clinical and research teams involved in this project and the track record of the industrial partners ensure a significant probability of success in terms of scientific achievements and technological transfer.
We wish you the best chance of success and we kindly ask you to include this support letter to your application dossier.

Best Regards,

Jessica Leygues
CEO of Medicen Paris Region

Copy: François Ballet MD, PhD Chairman of the Project Evaluation Committee, Medicen Paris Region

LABEL CAP DIGITAL 2022

cap-digital

ATTESTATION
DE LABELLISATION

NOM DU PROJET : re-Connect - Institut Audition et Cognition

PORTEUR : Institut pour l'Audition

PARTENAIRES : Assistance Publique - Hôpitaux de Paris (AP-HP) / Fondation Pour l'Audition / Institut national pour la recherche médicale (Inserm) / Université de Paris Cité

APPEL A PROJET : Instituts Hospitalo-Universitaires (IHU 3) - ANR

Résumé (en anglais)

Re-Connect proposes novel therapies and clinical pathways for auditory disorders, with a global approach that will boost the attractiveness of related careers. The originality of re-Connect lies in its broad scope addressing in a coordinated effort both peripheral and central auditory disorders, and disorders for which the auditory system can be leveraged for treatment. Re-Connect gathers outstanding auditory neuroscientists, neurologists, neurosurgeons, ENT specialists, geriatrists, internists, hematologists, hearing aid professionals and speech therapists, under the double mission of moving from compensatory to curative medicine in the domain of sensorineural hearing loss, and from empirical to evidence-based medicine in the domain of central auditory disorders.

Avis motivé

Le projet répond à plusieurs enjeux de la prévention de la perte d'audition. Il est très bien construit. La feuille de route décrit les ambitions sur 10 ans et détaille les dépenses estimées à 157 M€ sur les 5 premières années et 339 M€ au total sur 10 ans. Le soutien de l'ANR-IHU (50 M€) vise à sécuriser des projets scientifiques ambitieux et sera complété par 289 millions d'euros provenant d'autres sources de financement, assurant un effet de levier de près de 7 fois le soutien financier de l'ANR. Le projet s'attaque à un grand problème de société. Le consortium est solide et de notoriété. Le projet est cohérent, original et d'excellente qualité. Les annexes rassurent sur la crédibilité du BP. Les retombées sont claires et pertinentes.

Avis favorable, projet à soutenir.

Je soussigné, Charles Huot, Président du Pôle de Compétitivité Cap Digital, atteste que ce projet a été labellisé par le Bureau Exécutif de Cap Digital, en date du 02/11/2022 dans le cadre de l'appel à projets Instituts Hospitalo-Universitaires (IHU 3) opéré par l'ANR, dont la date de clôture est fixée au 07/11/2022.

A Paris le 02/11/2022,

CHARLES HUOT

MINISTÈRE DES ARMÉES
Liberté
Égalité
Fraternité

Auditory deficits affect more than 5 million people in France with severe direct consequences, notably on the cognitive, social and professional future in adults. In the French armed forces during training as well as overseas operations, soldiers are particularly at risk of acute noise trauma in relation to weapons noise and of chronic noise-induced hearing loss (e.g., air-force pilots; aircraft mechanics; motorcyclists). Protracted consequences on the health of soldiers and on their professional abilities form one of the costliest health issues that the French Department of Defense has to manage yearly. To address these issues, long lasting collaborations between Institut de Recherche Biomédicale des Armées and Institut de l'Audition, one component of the RE-CONNECT tender, examine improved diagnostic strategies and more timely interventions for hearing loss at stages when damage is still reversible. These collaborations would be strongly boosted in the framework of an IHU, exploiting the uniquely efficient tracking of all the auditory data of French military personnel countrywide.

One of their prospects is the emergence in France of strong teams able to develop new therapeutical concepts in the still badly lagging domain of audition. This would allow our country to catch up with other competitors in terms of creation of leading markets in the pharmacological and technological industrial sectors. The IHU 'RE-CONNECT' planned structure and collaborative projects aptly tackle the aforementioned issues.

In this context, I confirm that « Service de Santé des Armées » is delighted to express its strong interest in the IHU 'RE-CONNECT' project.

Sincerely yours,

Médecin général Eric VALADE
Chef de la division santé de défense
Direction centrale du service de santé des armées

ACADÉMIE NATIONALE DE MÉDECINE

In the now extensive French reimbursement system for hearing aids, academic partners involved in the 'RE-CONNECT' project contribute to a new definition of the curriculum of professionals in the growing field of audiology. In addition, the prospect of genuine therapies for deafness pioneered in Institut de l'Audition opens considerable opportunities to address the auditory handicap in a comprehensive manner, with the possibility for France to catch up with other countries in terms of creation of leading markets in the pharmacological and technological industrial sectors. The IHU 'RE-CONNECT' planned structure and collaborative projects aptly tackle the aforementioned issues.

In this context, I confirm that Académie Nationale de Médecine is delighted to express its strong interest in the IHU 'RE-CONNECT' project.

Sincerely yours,

Pr. Patrice Tran Ba Huy

Président of the Académie nationale de médecine

VILLE DE PARIS

A particularly interesting aspect of re-Connect from our perspective is its planned siting in a popular neighborhood of Paris that will directly benefit from local prevention campaigns, advanced clinical care, and sensitization to noise exposure in school children. Should re-Connect be labelled, we would be delighted to work hand in hand with the team to create fruitful exchanges with local and more globally Parisian schools and local associations. We will be happy to facilitate access to schools, kindergarten for deploying research programs and prevention campaigns. Likewise, we will facilitate the connection with our ageing population in increasing need of solutions for hearing problems, which is a major factor of cognitive decline.

We are also particularly enthusiastic about the re-Connect's project to include in its future building, 200 sq.m space for targeted exhibitions (science and art) and education programs, making a top research institute open to the local population, our schoolers in particular, hence being a source of potential inspiration (creativity, career etc.).

To conclude, I confirm that IHU re-Connect project is of great interest for the City of Paris and we look forward to working with its team in the near future.

M.C Lemardeley

Marie-Christine LEMARDELEY

Région îledeFrance

A particularly interesting aspect of re-Connect from our perspective is its planned siting in a popular neighborhood of Paris that will directly benefit from local prevention campaigns, advanced clinical care, and sensitization to noise exposure in schoolchildren. Should re-Connect be labelled, we would be delighted to work hand in hand with the team to create fruitful exchanges with local and more globally Parisian schools and local associations. We will be happy to facilitate access to schools, kindergarten for deploying research programs and prevention campaigns. Likewise, we will facilitate the connection with our ageing population in increasing need of solutions for hearing problems, which is a major factor of cognitive decline. We are also enthusiastic about the re-Connect's project to include in its future building, 200 sq.m space for targeted exhibitions (science and art) and education programs, making a top research institute open to the local population, our schoolers in particular, hence being a source of potential inspiration (creativity, career etc.).

To conclude, I confirm that IHU re-Connect project is of great interest for the Paris Cityhall and we look forward to working with its team in the near future.

Sincerely yours,

A. de la Coste

Alix de la COSTE
Deputy Director General in charge of
Higher Education, Reserarch, Technology transfer, Networks

ASSISTANCE PUBLIQUE HÔPITAUX DE PARIS

Paris, le - 2 NOV. 2022

55 boulevard Diderot - CS 22305
75610 Paris Cedex 12
Standard : 01 40 27 30 00
Télécopie : 01 40 27 55 77
secretariat.dg.sap@aphp.fr

LE DIRECTEUR GENERAL

Dear Members of the evaluation committee,

By this letter, Assistance Publique-Hôpitaux de Paris (AP-HP) fully supports the project Re-Connect « Institute for Hearing and Auditory Cognition » in response to the University Hospital Institutes (IHU) call 2022.

Hearing is a major public health issue across the society that affects 1 in 4 French adults. Hearing health challenges will expand because of the ageing population.
AP-HP, the Pasteur Institute and the Hearing Foundation have already alliances to develop major diagnostic and therapeutic innovations relying on the AP-HP in terms of clinical research. Re-Connect will deepen the development of this alliance by bringing together the excellence of researchers, the expertise of clinicians and industrials.
Re-Connect will become the unique place where basic research and clinical research can work in synergy to serve patients. It will bededicated to fundamental and translational research in hearing science, thus becoming the leading French and European research force devoted to hearing. This constitutes an attractive environment of excellence for talented researchers and clinicians, as well as for industrial partners.

The implementation of the future IHU is plan to be in the Lariboisière University Hospital (AP-HP) and integrated in the heart of the clinical teams. Notably, Lariboisière provides re-Connect with the single largest emergency entry point of the Parisian area for ear nose throat. The coordinated action of the three AP-HP sites (Lariboisière, Necker and Pitié Salpêtrière) is expected to endow re-Connect with the most important active patient population in Europe.
The ecosystem of the project, its location, its founding members and the multiple acts of supports given by the public authorities already set this project for success as a key player in the field of research and innovation in hearing.
In this ambitious plan, the AP-HP is fully committed to support this project in close collaboration with the other founding partners by promoting clinical trials and interactions with our healthcare system.

Nicolas REVEL
Nicolas REVEL
Directeur général
de l'Assistance Publique - Hôpitaux de Paris

INSTITUT DE LA VISION

In the event of re-Connect labeling, we look forward to helping and cooperating with this ambitious structure notably by:

- Pursuing the collaborations to develop new genetic tests for early, accurate genetic diagnosis, improved clinical tools for full-clinical investigations, and evaluation and validation of advanced innovative therapies (gene replacement and/or gene editing) for sensory disorders.
- Collaborating on novel research programs assessing the interplay between vision and audition to translate joint research into the development of new clinical solutions using vision to supplement and help repair hearing impairments and language disorders.
- Developing collaborative applied research programs to inspire novel cross-sensory bio/technological solutions (*e.g.* prosthetics, gene therapies, clinical interventions) to accelerate the translation of our discoveries to sensory impaired patients.
- Contributing cutting-edge computational modelling and AI analytic tools developed at IdV (Brette Lab, Marre Lab) for the analysis of rich multimodal datasets.

In return we expect to:

- Integrate data from audition (at both peripheral and central levels) to understand multisensory processing, use established clinical readouts from the inner ear to look into the eye, especially for dual sensory deficits affecting both organs.
- Contribute to novel research and translational approaches using the auditory function to enhance the way visually impaired patients sense their environment.
- Facilitate shared usage and co-development of our technological platforms (data science, connected health etc) to facilitate the cross-talk and transfer of knowledge between the scientific and medical disciplines in vision and audition.

To conclude, I confirm that the IHU Re-Connect project is of great interest for the IDV, and I unreservedly support its funding by ANR.

Sincerely yours,

Very sincerely.

Serge Picaud
Directeur / Director
INSTITUT DE LA VISION
17 rue Moreau
75012 PARIS
Phone : +33 (0) 1 53 46 25 13

In this context, I confirm that we at Hörzentrum Oldenburg gGmbH (HZO), Germany, would be delighted to support the project and we are pleased to contribute this LOI as a token of our support and appreciation. HZO is a leading provider of medical software for audiologists as well as a research institution with a strong focus on individual hearing loss, personalization of hearing loss compensation, and transfer of scientific results into clinical practice.

We are specifically looking forward to the way this new IHU would help create a European center of excellence for audition at the intersection between fundamental biomedical research and clinical application. Since we ourselves are part of the German cluster of excellence Hearing4all, one of the largest institutions in hearing research worldwide, it would be very exciting to see our international partners create similar structures to advance scientific progress in this tremendously important area.

In the event of labeling, we look forward to helping to create this ambitious structure around Anne-Lise Giraud. We are committed to supporting the project by sharing our experience as a translational research center in a related field.

To conclude, I confirm that the IHU Re-Connect proposal is of great interest for our company and we strongly support the proposal.

Sincerely yours,

Hörzentrum Oldenburg

Hörzentrum Oldenburg gGmbH
Marie-Curie-Straße 2
D-26129 Oldenburg
+49 (0) 441 2172-100
+49 (0) 441 2172-150
info@hz-ol.de

Dr. Jörg-Hendrik Bach
Head of R&D
Hörzentrum Oldenburg gGmbH

SYNEA, Syndicat National des Entreprises de l'Audition, represents the companies dealing with hearing and all the jobs of the audiology.
Given the ageing of the French population, its role is to raise awareness and inform the public and public authorities about hearing loss, a real public health issue.
It brings together local companies, major national brands, and independent hearing aid providers, representing more than 50% of the hearing aid activity in France.

For the players involved in audiology in France, this IHU would be an exceptional way to improve patient management. Fitting hearing aids requires the most precise adaption to the pathology of the hearing impaired.
IHU Re-connect, bridging researchers and clinicians treating patients, will allow an in depth understanding of the various types of deafness and presbycusis.
Audiologists, that are part of SYNEA, treat hundreds of thousands of patients every year.
They are implementing "big data" approaches that will clearly feed into future IHU research.

In the event of labeling, we look forward to helping to create this ambitious structure around Anne-Lise Giraud. We are committed to supporting the project, creating links with this future IHU, particularly through common projects and big data sharing.

To conclude, I confirm that IHU Re-Connect project is of great interest for our members and for hearing impaired people.

Sincerely yours,

Richard DARMON
President

UNIVERSITÉ MONTPELLIER – U.F.R. SCIENCES PHARMACEUTIQUES ET BIOLOGIQUES

MONTPELLIER AUDIOCAMPUS
CENTRE DE RECHERCHE ET DE FORMATION EN AUDIOLOGIE

In the event of re-Connect labeling, we look forward to helping and cooperating with this ambitious structure notably by providing the formation of researchers and students in the domain of audiology. In return we expect to benefit from fruitful collaborations, notably around for the constitution of cohorts and standardized audiological evaluation methods to develop big data analysis, as we are doing with the data base of Amplifon company (1,2 Million patients).

To conclude, I confirm that IHU Re-Connect project is of great interest for the AudioCampus Montpellier, and will reinforce our national network of infrastructures, and will contribute to the international visibility of France as a key play in the domain audition research, therapy, and education.

Sincerely yours,

Jean-Luc PUEL

UNION DES ASSOCIATIONS DE PERSONNES MALENTENDANTES

Les objectifs communs entre le BUCODES SurdiFrance et l'IHU Re-connect sont nombreux :

- Participer à combler l'écart existant au niveau national dans le diagnostic et à améliorer la prise en charge des personnes sourdes ou malentendantes, acouphéniques ou hyperacousiques…
- Informer les personnes concernées des programmes de développement et de commercialisation de nouvelles thérapies ou de nouveaux dispositifs/technologies pour diagnostiquer ou traiter la déficience auditive et autres pathologies comme les acouphènes ou l'hyperacousie ;
- Contribuer à améliorer la qualité de vie des personnes concernées ;
- Aider au développement de centres de référence pour une meilleure prise en charge des personnes concernées ;
- Promouvoir la prévention des troubles de l'audition, des acouphènes, de l'hyperacousie, etc.

Nous soutenons sans réserve la création de cette structure ambitieuse autour de la Pr Anne-Lise Giraud et de l'équipe de médecins et de chercheurs du projet IHU Re-connect tous impliqués pour le bénéfice des personnes concernées. Nous serions très heureux d'initier des collaborations avec les membres du projet IHU Re-connect pour faire avancer nos objectifs communs.

En conclusion, le projet IHU Re-Connect est d'un grand intérêt pour la fédération BUCODES SurdiFrance et pour les personnes concernées.

Bien cordialement,

Pour le BUCODES
Yann Griset, président

Bucodes-SurdiFrance
BUreau de COordination des associations
De DEvenus Sourds et malentendants
MDA 18 (b 83), 15 passage Ramey 75018 Paris
contact@surdifrance.org http://www.surdifrance.org

ANNEXE SCIENTIFIQUE / SCIENTIFIC APPENDIX

AVATAR MEDICAL looks forward to creating connections with teams of the IHU Re-connect to develop next generation technologies for skilled surgeons and health care professionals to provide the best treatment to patients. We especially believe that our technology could help in the planification and realization of complex surgeries or invasive treatments, providing enhanced 3D visualization of the anatomy of the patient before and/or during the operation, and for post-surgery care.

Cochlear implants could be cited as an example of possible collaborations, especially in the context where connections have already been established with Pr Nguyen's team.

In the event of labeling, we look forward to helping to create this ambitious structure around Anne-Lise Giraud. We are committed to supporting the project by involving the time of our software and biomedical engineers for feasibility studies.

To conclude, I confirm that IHU Re-Connect project is of great interest for our start-up company,

Sincerely yours,

Elodie Brient-Litzler C.O.O.

AVATAR MEDICAL

CorTec Thinking ahead

CorTec offers the most relevant components for the development of innovative personalized therapies for different neural diseases.

We provide solutions for communication with the nervous system – to enable our customers to develop novel and effective therapies and medical devices.

Our active implant technologies pave the way for new perspectives on the treatment of neurological disorders. The overall goal is to improve the life quality of people suffering from neurological diseases. As CorTec we see a number of common benefits and goals between us and the IHU:

- Most important we see the potential to accelerate the development and the market entry of new therapies through direct collaboration with leading academic partners. As a small company we need strong academic research groups that can conduct clinical trials in new fields.
- In particular we think that CorTec's novel Brain Intechange technology (https://www.cortec-neuro.com/products-and-services/active-implant-technology/brain-interchange-technology/) can contribute to solving multiple challenges for new therapies to be developed by IHU.
- Building up a center of excellence in medical device related clinical research in central Europe to mitigate the gap in this field between EU and US.
- Participate in bridging the existing national gap in diagnostic and treatment of audition and related severe diseases
- Train and develop next generation technologies for skilled surgeon and health care professional to provide the best treatment to patient
- Promote IHU public-private collaborative model that gathers top fundamental and clinical research players

Dr. Oliver Bärtl
Chief Executive Officer

Dr. Jörn Rickert
Chief Scientific Officer

COLLIN has been a partner since the beginning of the creation of the RobOtol system with the research team currently headed by Pr. Yann Nguyen and is now the manufacturer of the RobOtol system. The company has a R&D department headed by Stéphane Mazalaigue. The industrialization of the RobOtol prototype relied on the work of COLLIN's R&D and quality departments. COLLIN has twenty years of experience in the development of navigation systems for ENT surgery. It has recently developed and validated for sinus surgery, the latest version of navigation called Collin Navigation Solutions (CNS).

COLLIN Au service de la spécialité ORL

The collaboration with IHU Re-connect aims to train and develop next generation technologies for skilled surgeon and health care professional to provide the best treatment to patient.
In the event of labeling, we look forward to helping to create this ambitious structure around Anne-Lise Giraud. We are committed to supporting the project with scientific and technique collaboration.

To conclude, I confirm that IHU Re-Connect project is of great interest for our COLLIN company.

Sincerely yours,

Nicolas Prévost CEO, COLLIN

COLLIN
3, rue de Robinson
92227 Bagneux cedex
Tél. 01 49 08 08 88 - Fax 01 49 08 08 89
E-mail : info@collinmedical.fr

Biogen

Therefore, Biogen commits to supporting your project, in the following ways

- ✓ Contribute in building the first European excellence center for audition from ear to the brain at the intersection between fundamental and clinical research
- ✓ Use auditive pathways to treat Re-Connect IHU specifically Alzheimer's Disease
- ✓ Train and develop next generation technologies for diagnosis, treatment and follow up of the patient to provide the best treatment to patient
- Promote IHU public-private collaborative model that gathers top fundamental and clinical research players

To conclude, I confirm that IHU Re-Connect project is of great interest for Biogen.

For the avoidance of doubt, this letter is non-binding and simply formalizes Biogen's interest in the so called **IHU Re-connect.**

Yours sincerely,

DocuSigned by:
5510B9DA2BB94D1...

Marina Vasiliou
Managing Director, Biogen France

DEVIALET

Devialet is committed to evolving its technology and product design, without any compromise on sound quality, until everyone can access and enjoy Devialet in every moment of their life.

As a key leader in the field of audition, our expectations for this project are:

- Take part in the global and increasing challenge of hearing loss which lays at the crossroad of public health, technology and innovation.
- Partner with IHU Re-Connect in many possible ways to help the research move forward and give access to new innovations to the many through our products.
- Contribute, as a company, to the common good.

In this context, I confirm that Devialet would be delighted to support and be involved in the Institut de l'Audition and in the IHU Re-connect project.

- Reconciling technological excellence and hearing health requirements
- Contribute in building the first European excellence center for audition at the intersection between fundamental and clinical research
- Participate in bridging the existing national gap in diagnostic and treatment of audition
- Accelerate the development and market entry of new therapies and equipment to treat hearing impairment through public-private synergies
- Train and develop next generation technologies for skilled surgeon and health care professional to provide the best treatment to patient
- Promote IHU public-private collaborative model that gathers top fundamental and clinical research players >

In the event of labeling, we look forward to helping to create this ambitious structure around Anne-Lise Giraud. We are committed to supporting the project in many potential ways such as:

- Integrate IHU Re-Connect technologies into our products
- Co-engineer innovative technologies
- Commonly communicate to the many in order to raise public awareness about hearing health

To conclude, I confirm that IHU Re-Connect project is of great interest for our company.

Sincerely yours,

03/11/22

DEVIALET
35 RUE LA BOETIE - 75008 PARIS
N° TVA : FR22 502 155 682
N° SIRET : 502 155 682 00110

HUMANS MATTER

In the last 5 years, we have decided to invest in the auditory area trying to build solutions to train central audition and help first people with cochlear implant, then people with presbycusis. A first generation of tools is currently provided on https://www.profonia.com/.

Today, our goals are at two levels:

- On the medical and technological sides we want to create a new generation of digital therapeutics that will integrate AI algorithms to better adapt the training programs to the real lives of patients and provide personalized treatments. This requires to be able to collect massive volumes of data and validate the solutions through large medical trials.
- On the clinical side, there is today a consensus that we need to have a better collaboration between otorhinolaryngologists, audiologists and SLP. With our central position on the SLP market we aim at playing a facilitator role.

On these two main goals, it is obvious that the IHU Re-Connect can dramatically accelerate our projects.

Franck Tarpin-Bernard
Managing Director Humans Matter

FUJIREBIO Diagnostics, Inc.

Given the foregoing, Fujirebio Europe expresses its non-binding intent[1] to contribute to the operations of the Institut de L'Audition and the IHU Re-Connect. In doing so, it will participate and contribute to the research and innovation as planned under this project, but always subject to future negotiations of collaboration agreements, and depending on its own financial and operational priorities and capabilities. Amongst others, Fujirebio Europe will support:

1/ Collaborations in the clinical trials and specifically developing non-invasive biological biomarkers for monitoring targeted subjects; and

2/ Co-developement of new easy and reliable biomarker-based models for risk stratification and prediction of dementia in cognitive impairment, neurological and auditory disorders.

Fujirebio Europe looks forward to helping create this ambitious structure around Anne-Lise Giraud and the re-Connect team of physicians and researchers. And it intends to provide in-vitro diagnostic, prognostic or disease activity assays (research or CE-marked) awarded through open competition upon the condition to sign mutual biomarker research agreements and protocols.

Fujirebio Europe is looking forward to contribute to this important project, that will hopefully drive our understanding of how to accurately predict disease progression and how to tailor treatments in a highly individualised, patient-centric manner.

To conclude, I confirm that the IHU Re-Connect project is of great interest to our company, Fujirebio Europe.

Sincerely yours,

Christiaan De Wilde
CEO

ESSILOR

On behalf of Essilor International, I confirm that we wish to bring our support to the re-Connect IHU project. This initiative could potentially give rise to future joint actions or partnerships in the fields of innovation, training or dissemination, as illustrated below:

- valueing EssilorLuxottica's 'smart eyewear' technologies for hearing disorders management, potential innovation fields being: real-life data based individual assessment with instrumented eyewear; sensory and cognitive augmentation for the hearing impaired; audio features (such as bone conduction) etc.
- developing multi-modal (hearing and vision) sensory-cognitive rehabilitation protocols;
- using new sensory biomarkers for sensory and neurological ageing (presbyiopia/presbycusis) or disorders;
- foster population awareness and professional training on sensory (hearing and vision) protection, correction, prevention and on novel examinations combining imaging and functional assessments;
- creating more patient-benefiting bonds between academia, industry, health actors, policymakers and payers, especially because hearing or vision disorders are underserved health fields in public health or funding schemes;
- leveraging common connections to start-ups and entrepreneurship clusters in sensory care and wearable devices including eyewear;

Essilor international, a company of EssilorLuxottica, fully supports the re-Connect IHU project, shares a common vision and, in the event of labeling, wishes to tackle common challenges and to maximize impact of new technologies in the important sensory care health sector.

Yours sincerely,

Gilles Le Saux
Senior Vice President Foresight & Research
Essilor International, group EssilorLuxottica

Essilor International
Direction R&D Internationale
CI&T 8 - 38-69, Boulevard Jean-Baptiste Oudry
94000 CRETEIL
Tél. : 01 49 80 62 80

InstitutRoche

We foresee a great potential for collaborative research projects of mutual interest in the field of hearing-related diseases and in particular within the WP4 dedicated to the study of the association between cognitive decline and hearing-related disorders. We see a clear opportunity to bring our expertises and to participate in preclinical and clinical research combining ENT and dementia assessments, including approaches that might complement pharmacotherapy. The IHU Re-Connect would be a center of excellence for Roche, other small and large pharma and research organizations to conduct future studies at the center. We also recognize the foundational efforts in terms of basic science and biomarker enabling research (WP1-5) that, upon realization, will facilitate discovery and development of novel therapies.

Given both the ambition and potential of this translational research project we, on behalf of Roche and the Institut Roche as a major Biopharmaceutical and Diagnostics company, are pleased to support this project.

Magnus Fontes,
General Manager of Institut Roche

Date: 04 November 2022
Signature: DocuSigned by: Magnus Fontes 8F5B2DDAF7B844A...

Perha Pharmaceuticals
from Sea to Pharmacy

Perha Pharmaceuticals is committed to collaborate with Dr. Petit's team by co-developing our otoprotective drug candidate and sharing our biotech experience, in terms of:

- synthesis of drug candidates and research reagents by classical medicinal chemistry guided by molecular modeling,
- molecular target validation in isolated organs of Corti and in animals,
- pharmacological characterization and optimization of the most active compounds,
- proof-of-concept of otoprotection by the drug candidates in animal models of hearing loss,
- preparing regulatory preclinical studies and clinical trials protocols for the selected otoprotective product.
- evaluating of otoprotection in patients exposed to cisplatin or aminoglycoside antibiotics and treated with the drug candidate,
- providing expertise in patent protection, in clinical drug development and in raising private funds,
- promoting an IHU public-private collaborative model,
- training young students/young researchers to entrepreneurship in biotechnology.

To conclude, I confirm that IHU Re-Connect project is of great interest for our biotech company, Perha Pharmaceuticals and that we are eager to participate to this ambitious yet realistic project, a project of high societal impact targeting very important unmet medical needs.

Sincerely yours,

Laurent MEIJER
Chairman & Chief Scientific Officer
Perha Pharmaceuticals & ManRos Therapeutics

ANNEXE SCIENTIFIQUE / SCIENTIFIC APPENDIX

my brain tech

In this context, I confirm that myBrain Technologies would be delighted to support and be involved in the Institut de l'Audition and in the Work Package 7 (WP7) of the IHU Re-connect project.

WP7 aims at facilitating access and integration of connected solutions (devices, apps) to leverage these opportunities in the Re-connect project.

WP7's *CoReMed* (*Connected Research and Medicine*) platform is a digitalized platform aiming at promoting novel experimental research and clinical practices, from observational (gathering data and providing insights) to interventional practices (effectively acting in the treatment process).

WP7 facilitates the collection of multimodal data to link patients, diseases, and treatments, allowing for time-saving diagnoses and treatment tools.

Based in Paris (France), myBrain Technologies is one of the world leaders in neurotech and operates in the healthcare sector and personalized digital medicine.

The company is developing digital technologies and non-invasive neuro-technologies combining artificial intelligence and neuroscience, based on numerous patents and its know-how, to objectify the mysteries of human behavior through brain activity (myBrain Tech platform).

myBrain Technologies has been deploying its solutions for the transport industries and medical research for several years to support them in the design of products and services centered around people.

myBrain Technologies collaborates with prestigious research institutes such as the Brain Institute (ICM), attached to the Salpêtrière Hospital in Paris.

As a co-partner of the WP 7, myBrain Technologies participation aims at the realization of the following tasks based on myBrain Tech platform:

- Co-develop a multimodal recording solutions using connected devices based on myBraintech platform and technologies
- Create autonomous experimental practices for digitalized research/medicine,
- Co-develop with the Institut Pasteur teams new tools allowing a multimodal data curation and analyses for neuromarkers assessment and follow-up,
- Participate in bridging the existing national gap in diagnosis and treatment of audition.
- Potentially commercialize the neuromarkers coming out from the collaboration in WP7

Yohan ATTAL,
CEO & Co-founder
myBrain Technologies

IQVIA™

In this context, I confirm that IQVIA would be delighted to support and be involved in the Institut de l'Audition and in the IHU Re-connect project.

IQVIA is a leading global provider of advanced analytics, technology solutions and clinical research services to the life sciences industry dedicated to delivering actionable insights.

- Contribute in building the first European excellence center for audition from ear to the brain at the intersection between fundamental and clinical research
- To facilitate the conduct of industry-sponsored clinical trials (patients 'recruitment) and real-world evidence studies (RWS) within IHU teams
- To collaborate to increase access to Clinical Trials and therapeutic innovation for patients and investigators (academic and/or Industry- sponsored studies)
- To share expertise on methodologies and design on Clinical Trials protocols and RWS
- To share our expertise, knowledges and trainings for our respective teams in these research areas.
- To collaborate on cohorts and biobanks data to launch innovative projects (Algorithm/predictabilities)
- Promote IHU public-private collaborative model that gathers top fundamental, clinical research and analytics players.

WISE can support the IHU in order to:

- Contribute to building the first European excellence centre for audition at the intersection between fundamental and clinical research,
- Participate in bridging the existing national gap in diagnostic and treatment of audition,
- Accelerate the development, the validation and market entry of new devices to treat hearing impairment (i.e., chronic sensoryneural hearing loss, auditory perception disorders and disorders of the audio-phonological loop) through public-private synergies,
- Participate to the development of mini-invasive electrodes that can act as an interface between the brain and external devices, and
- Participate to the training of surgeons and health care professionals to provide the best treatment to patients.

In the event of labeling, we look forward to helping to create this ambitious structure around Anne-Lise Giraud. We are committed to supporting the project by giving access to our capability of producing minimally invasive cortical electrodes with excellent adhesion and adaptability to neural tissues and with improved nervous signal transmission capability compared with existing technologies. Furthermore, we will participate to clinical trials for bringing new technologies to market and we will support the training of health care professionals.

Mr Luca Ravagnan
CEO of WISE

Sensorion
The Inner Ear Diseases company

Common benefits between the partner and the IHU involve:

- Acceleration of the development and market entry of new therapies to treat hearing impairment through public-private synergies
- Promotion of IHU public-private collaborative model that gathers top fundamental and key Biotech player in hearing space
- Development of new tools, such as mouse models, or new hearing monitoring strategy, for a better understanding of hereditary monogenic forms of deafness

In the event of labeling, we look forward to helping to create this ambitious structure around Anne-Lise Giraud and the re-Connect team of physicians and researchers. Sensorion is already engaged in a broad strategic collaboration with Institut Pasteur/ Institut de l'Audition focused on the genetics of hearing. We are committed to supporting the project by strengthening our partnership.

To conclude, I confirm that IHU Re-Connect project is of great interest for Sensorion.

Sincerely yours,

DocuSigned by:
Nawal Ouzren
A4EDE354AC354DA...

Nawal Ouzren, CEO of Sensorion

Starkey Hearing Technologies

Synergies between Starkey, IDA and the IHU Re-connect project are many. Below are some of the main areas where Starkey and IDA could work hand-in-hand, in the context of or beyond the IHU Re-connect project:

- Accelerate the development and market entry of new technologies to treat hearing impairment through public-private synergies. Owing to its strong experience and expertise in hearing-aid R&D and commercialization, Starkey employees could bring an industry perspective to IDA researchers and strategists, to help the institute bridge the gap between and beyond R and D.
- Participate in bridging the existing national gap in diagnostic and treatment of audition. Today, hearing-aids remain by far the premier solution to hearing-loss rehabilitation. Thus, while alternative treatments for hearing loss are being developed, it is crucial to further fuel advances in the technological capabilities of this primordial means of auditory rehabilitation.
- Contribute in building the first European excellence center for audition at the intersection between fundamental and clinical research. Owing to its network of hearing scientists and clinical audiologists, IDA could foster the design and evaluation of novel hearing-aid or hearing-protection technologies.
- Train and develop next generation technologies for hearing-care professionals, specifically, hearing-aid dispensers. Today already, Starkey is actively engaged in education and training through an online platform (l'Académie Starkey, https://starkey.airteach.co/) where hearing-aid dispensers can learn about hearing-aid and hearing-protection solutions, publications (white-papers and peer-review articles, conference posters), lectures on specialized topics in various audiology schools in France, … Starkey experts in hearing science and audiology would be delighted to collaborate with IDA to help boost continued education and training of hearing-care professionals.
- Promote IHU public-private collaborative model that gathers top fundamental and clinical research players. Like the IDA, Starkey R&D employs highly talented engineers, audiologists and hearing-science researchers, many of whom were trained and worked in the best academic institutions and specialized laboratories (MIT/Harvard, University of Cambridge, University of Oldenburg Center for Excellence in Hearing, University of Minnesota, …) This shared academic background would facilitate conversations between Starkey and IDA researchers.

We are convinced that these multiple potential areas of intersection between the research and development interests of IDA and of Starkey will be mutually beneficial to all.

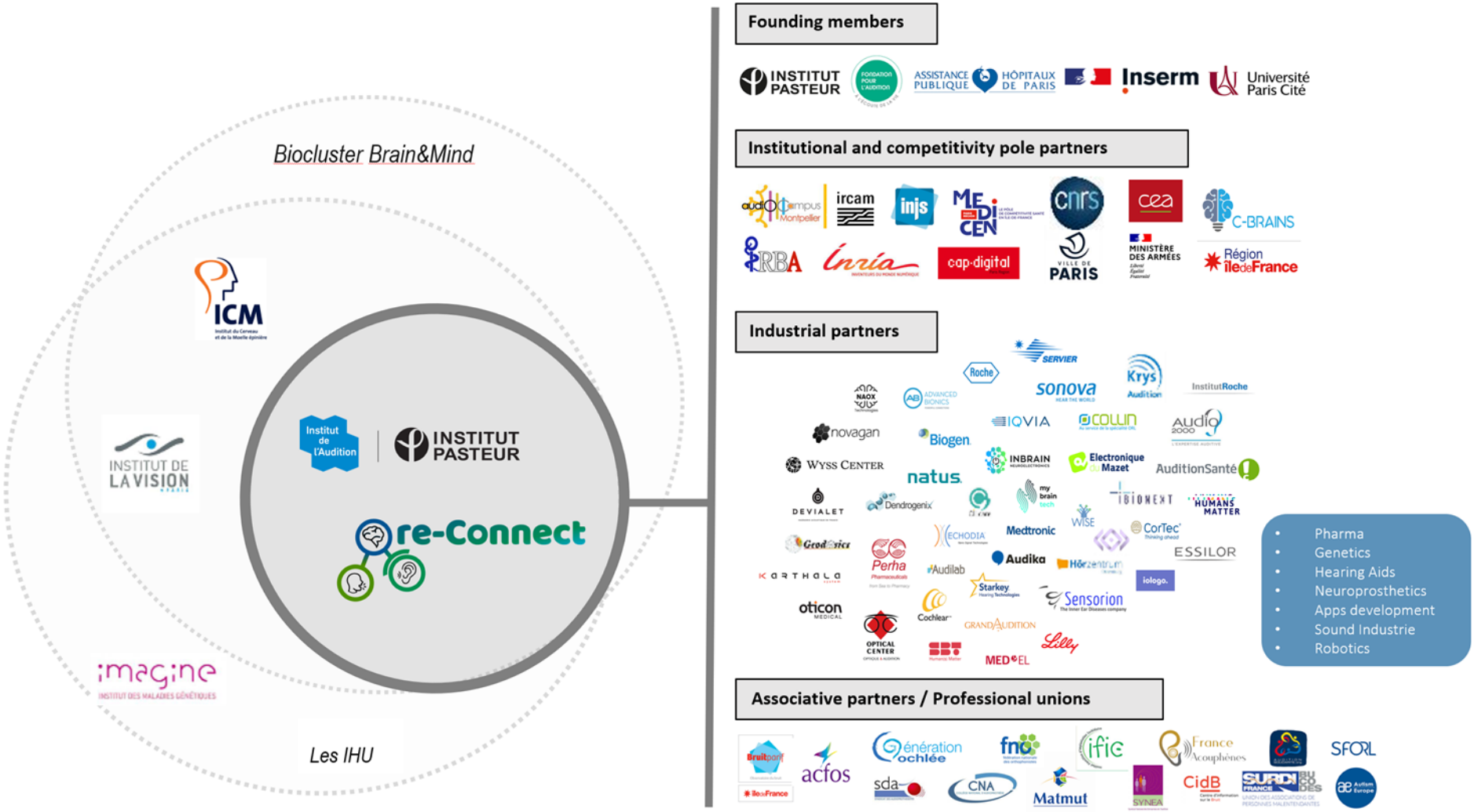
Thus, we are delighted to confirm Starkey's intention to support IDA and the IHU Re-Connect project in every way it can.

Sincerely,

Fabrice Vigneron
Managing Director

Christophe Micheyl, PhD
Senior Principal Scientist in Hearing Science

7.7. RE-CONNECT ECOSYSTEM



7.8. SITTING LARIBOISIÈRE: DESCRIPTION OF REQUIRED SPACE ON LARIBOISIERE SITE, IMPLANTATION

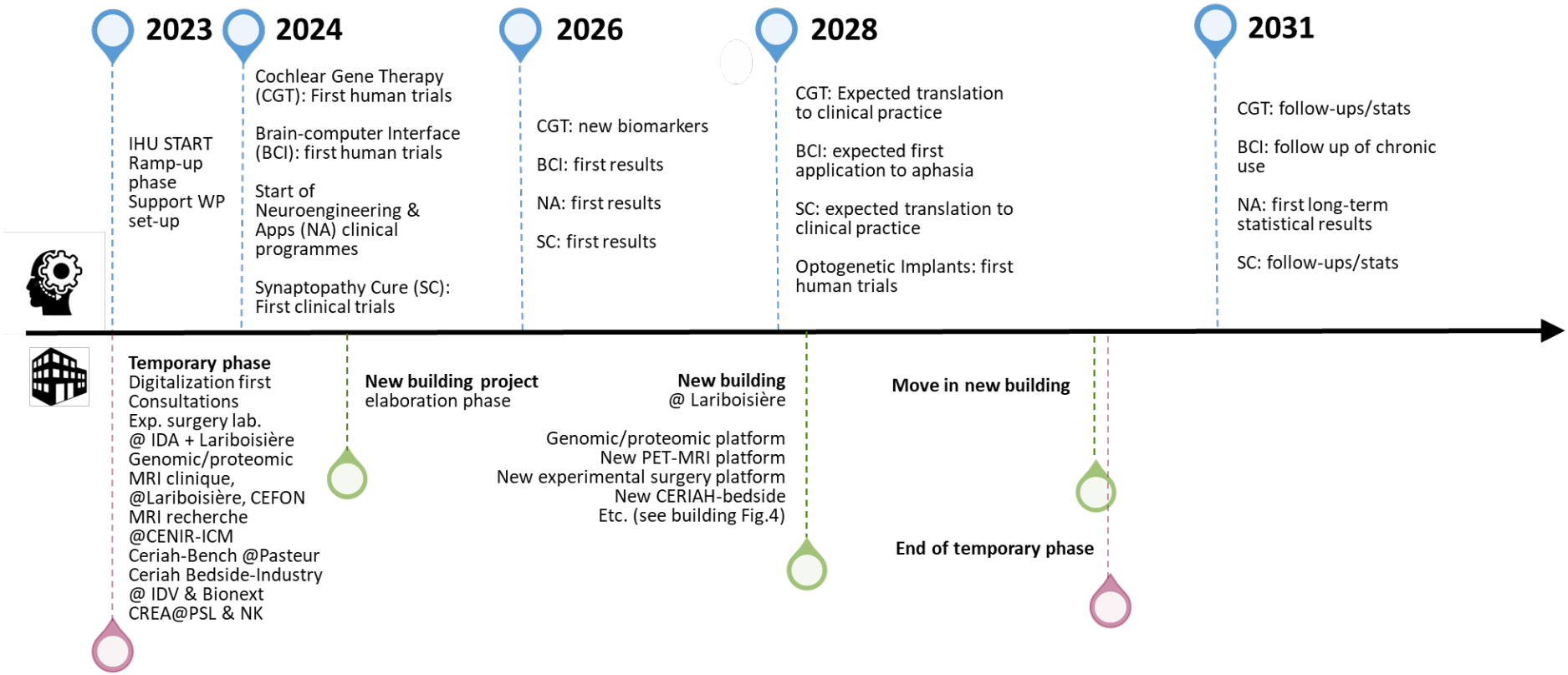


Figure 3: *Prospective timeline, with two phases: before and after the construction of the re-Connect building at Lariboisière Hospital*

re-Connect

Siting

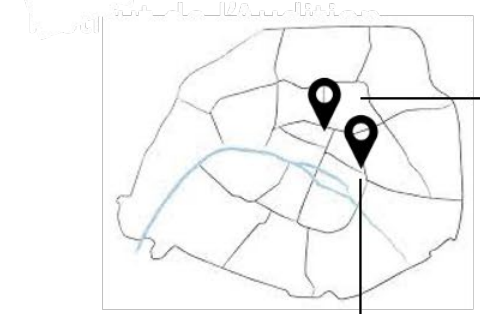


Figure 4: *Re-Connect siting in the north bank of Paris*

7.9. PARTNERSHIPS AND COLLABORATIONS

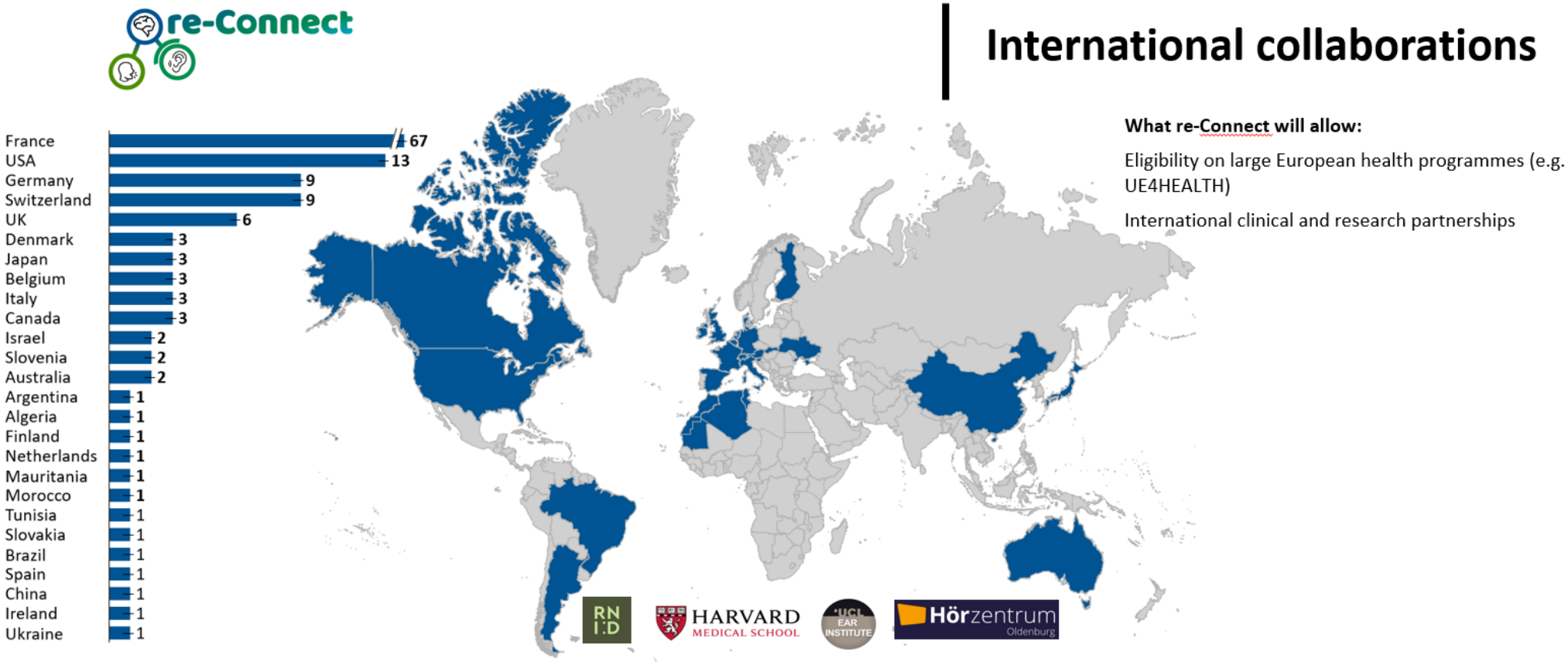


Figure 5: *Map of current national and international partnerships*

7.10. PRESENTATION OF THE IHU SHELTERING FOUNDATION – THE INSTITUT PASTEUR

The Institut Pasteur and the Pasteur Network

The Institut Pasteur, a non-profit foundation with recognized charitable status set up by Louis Pasteur in 1887, is today an internationally renowned center for biomedical research. In the pursuit of its mission to tackle diseases in France and throughout the world, the Institut Pasteur operates in four main areas: research, public health, training, and development of research applications. More than 2,800 people work on its Paris campus.

The Institut Pasteur is a globally recognized leader in infectious diseases, microbiology, and immunology, with research focusing on the biology of living systems and particularly molecules, cells, tissues, living organisms, and host-microbe interactions. Among its areas of investigation are emerging infectious diseases (COVID-19, Ebola, Zika, etc.), antimicrobial resistance, certain cancers, neurodegenerative diseases (Alzheimer's and Parkinson's disease, etc.), and brain connectivity disorders (autism, depression, etc.). The Institut Pasteur's outstanding research is facilitated by the development of a technological environment of the highest standard, with core facilities for nanoimaging (cryo-electron microscopy, cryo-electron tomography, etc.), computational biology and artificial intelligence.

This research aims to expand our knowledge of the living world and also to accelerate the development and identification of new diagnostic, treatment and prevention strategies. Since its inception, 10 Institut Pasteur scientists have been awarded the Nobel Prize for Medicine, including two in 2008 for the 1983 discovery of the human immunodeficiency virus (HIV) that causes AIDS.

The Institut Pasteur is part of the Pasteur Network, a worldwide network of 33 members on five continents, united by Pasteurian values, that contribute to global health.

Since 2010, the Institut Pasteur has supported the United Nations Global Compact and the ten principles relating to human rights, labour, environment and anti-corruption (https://www.unglobalcompact.org/what-is-gc/mission/principles). The Institut Pasteur also joined the Paris Action Climat charter of the city of Paris in 2020, which will become in 2022 the Climate Action Biodiversity Plan pact. For more information on our commitments: https://www.pasteur.fr/en/institut-pasteur/our-engagements

Since July 1, 2021, the Institut Pasteur is a research partner organization of Université Paris Cité.

7.11. LIST OF ABBREVIATIONS

3D: 3 dimensions
AD: Alzheimer's disease
AI: artificial intelligence
ALG: Anne-Lise Giraud
AMU: Aix-Marseille Université
ANR: Agence Nationale pour la Recherche
ANSM: agence nationale de sécurité du médicament et des produits de santé
APDs: auditory perception disorders
ARHL: age-related hearing loss
ARO: Association for Research in Otolaryngology
ASD: autism spectrum disorder
AVVR: audio-visual speech virtual reality
BCI: brain computer interface
CEA: Commissariat à l'Energie Atomique
CENIR: Le Centre de NeuroImagerie de Recherche
CEFON: Centre d'Explorations Fonctionnelles Oto-Neurologiques

CeRIAH: Centre de Recherche et d'Innovation en Audiologie Humaine

CGT: Cochlear gene therapy

CREA: Clinical audiology research platforms

CT-scan: computed tomography scan

DARRI: Direction des Applications de la Recherche et des Relations Industrielles

DIM: Domaines d'intérêt majeur

DRCI : Direction de la Recherche Clinique et de l'Innovation

ECoG: electrocochleography

EEG: electroencephalography

ELSI: Ethical, Legal and Social Impacts

ENS: Ecole Nationale Supérieure

ENT: Ear, Nose, Throat Doctor

EPS : Etablissement Public de Santé

ERC : European Research Council

FDA : Food and drug administration

FET Open: Futur Emerging Technologies Open

fMRI: functional Magnetic Resonance Imaging

FPA: Fondation pour l'Audition

FRM: Fondation pour la Recherche Médicale

GP: general practitioner

GWAS: genome-wide association studies

HEADD: Hearing and auditory dysfunctions in dementia

HEGP: Hôpital Européen Georges Pompidou

HL: hearing loss

HLD: Hearing Loss and Dementia

ICM: Institut du Cerveau et de la Moelle épinière (Paris Brain Institute)

IP: Intellectual Property

IRBA: Institut de recherche biomédicale des armées

IRCAM: Institut de Recherche et Coordination Acoustique/Musique

PET: positron emission tomography

PIA: Plan d'Investissement d'Avenir

PHRC : Programme Hospitalier de Recherche Clinique

PIs: principal investigators

POC: proof of concept

PRC : projet de recherche collaboratif

PSL : Paris Sciences & Lettres

QoL: quality-of-life

RGPD: règlement général sur la protection des données (GDPR)

SC: Synaptopathy cure

SEEG : stereo-electroencephalography

SFAV : Sudden and fluctuating audiovestibular

SUs: start-ups

SV2A PET-MRI: synaptic vesicle protein 2A positron emission tomography-magnetic resonance imaging

tACS : transcranial alternating current stimulation

tD/ACS : transcranial direct/alternating current stimulation

UCL: University College London

UMR: unité mixte de recherche

UPC: Université Paris Cité

UPS : Université Paris Sorbonne

VD: Vascular dementia

WES: whole-exome sequencing

WHO: World Health Organization

WP : workpackages

YoY: Year over Year

IdA research teams:

ACC-IdA: Auditory Cognition and Communication

CNSA-IdA: Neural coding in the auditory system

DCT-IdA : Cochlear development and therapeutic perspectives

DSAMP-IdA: Auditory System Dynamics and Multisensory Processing

EXPLOSNS-IdA: Clinical and translational exploration of sensorineural hearing loss

IThA-IdA: Auditory therapies innovation laboratory

NeuroSpeech-IdA: Neural coding and neuro-engineering of human speech functions

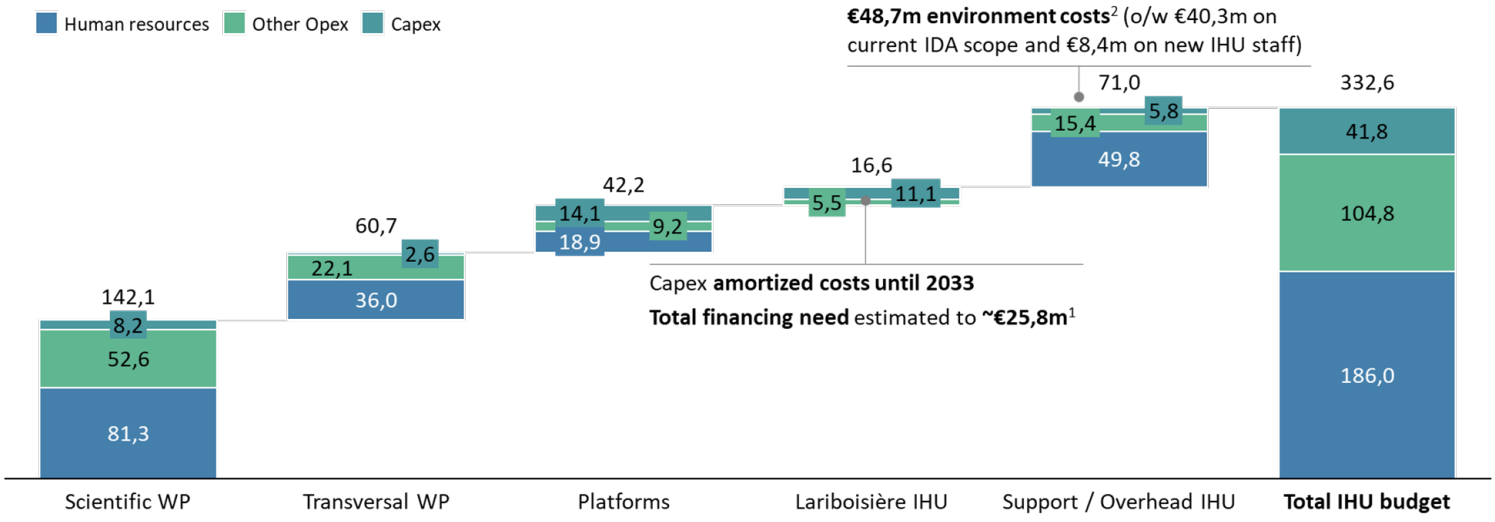
PCAC-IdA: Plasticity of central auditory circuits

TGTD-IdA: Technologies and Gene Therapy for Deafness

PSDPT-IdA: Progressive Sensory Disorders, Pathophysiology and Therapy

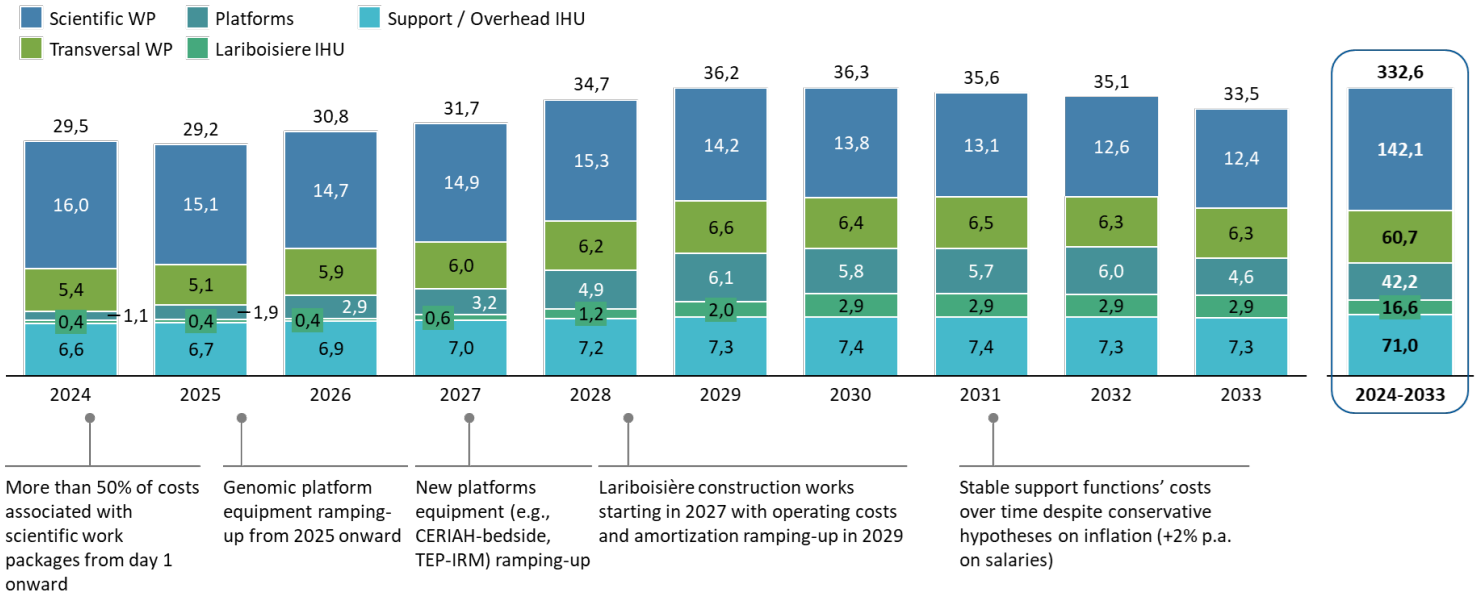
7.12. IHU RE-CONNECT BUSINESS PLAN

7.12.1. Cumulative IHU re-Connect costs over 10 years

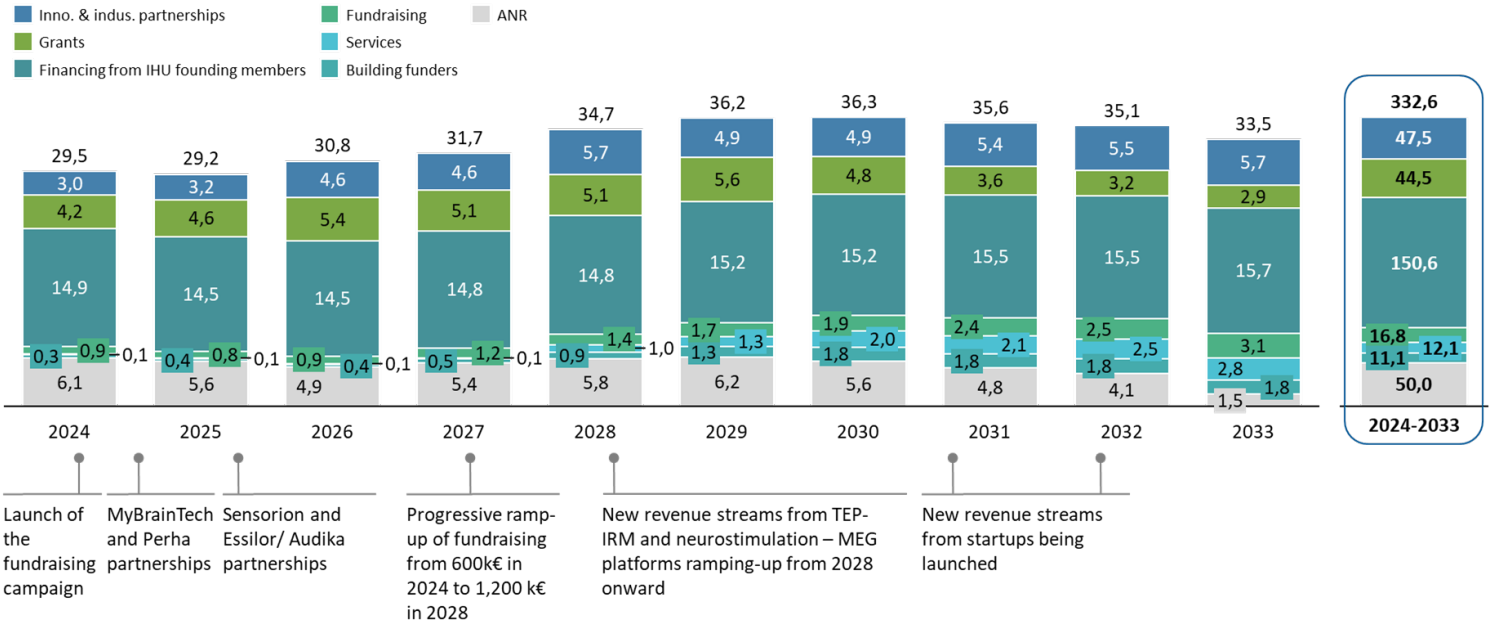


1. €22,2m for construction; €3,6m for inner space arrangement
2. Environment costs = "Frais d'environnement"; Fundraising/ support IHU team = €14,9m; Other opex & IDA staff = €7,4m

7.12.2. Annual IHU re-Connect costs over 10 years



7.12.3. Annual IHU re-Connect resources over 10 years



7.12.4. Total costs for scientific and transversal workpackages over 10 years