Position Description

1. General Information

Name of the position	**Artificial Intelligence to support self-expression: towards neurodiverse communication spaces**
Foreseen date of enrolment	January 2025
Position is funded by	- COFUND, Marie Skłodowska-Curie Actions (MSCA), Horizon Europe, European Union - Université Grenoble Alpes (UGA) - Queensland University of Technology (QUT)
Research Host	Université Grenoble Alpes
PhD awarding institutions:	Université Grenoble Alpes & Queensland University of Technology
Locations	Primary: Grenoble, France Secondary: Brisbane, Australia
Supervisors	Didier Schwab (UGA) Associate Professor Laurianne Sitbon (QUT)
Group of discipline	Informatics, Computer Science

2. Research topics (only one of these projects will be funded)

Project 1: *Identifying communication materials for pictorial communication in context*

This project will explore the affordances of emerging AI models and algorithms for Augmented Alternative Communication (AAC) approaches respectful of the competencies and preferences of people with intellectual disability.

In this project, the PhD candidate will establish algorithms for recommending image sets from diverse everyday contexts, such as a picture of a scene, the content of a book, or a restaurant menu. There are a number of approaches that can be considered here, from using keyword selection and large-scale lexical resources such as WordNet to generating captions and summaries using deep learning approaches.

The candidate will create flexible and configurable prototypes in order to engage with participants with intellectual disability in order to establish the types of images that are useful, and how many should be recommended, or how

they may be organized. The prototype will be trialed with people with intellectual disability as part of the thesis, and refined based on the preferences and usage of research participants.

Supervisors: Didier Schwab (UGA), Laurianne Sitbon (QUT) & Rodrigue Cabrerat (UGECAM Rhône-Alpes)

Research Fields: Natural Language Processing, Semantics, Recommender Systems, Human-Computer Interaction

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Project 2: *Generating personalised images for use in communication by with minimally-verbal adults*

This project will explore the affordances of emerging AI models and algorithms for Augmented Alternative Communication (AAC) approaches respectful of the competencies and preferences of people with intellectual disability.

In this project, the PhD candidate will consider the potential of emerging AI generative models, such as Stable Diffusion, to fabricate visual communication materials that are personalized to individuals with intellectual disability for use in AAC systems or in shared communication contexts. These images are generated, or can be retrieved, based on elaborated description. As a result, the project will investigate not only the image generation process itself, but more so the caption generation. The generated images will account for short history of image selection by a person in order to refine a model of style and content preferences, as well as a preferred complexity of visual content (eg. Number of concepts carried by images). Indeed, some images convey a single unit of meaning (eg. An object), while others can represent complex scenes.

The candidate will create flexible and configurable prototypes in order to engage with participants with intellectual disability in order to establish the types of images that are preferred. The prototype will be trialed with people with intellectual disability as part of the thesis, and refined based on the preferences and usage of research participants.

Supervisors: Didier Schwab (UGA), Laurianne Sitbon (QUT) & Rodrigue Cabrerat (UGECAM Rhône-Alpes)

Research Fields: Natural Language Processing, Semantics, Human-Computer Interaction

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Project 3: *Deep learning methods for Augmented and Alternative Communication*

This project will explore the affordances of emerging AI models and algorithms for Augmented Alternative Communication (AAC) approaches respectful of the competencies and preferences of people with intellectual disability.

In this thesis, we want to study how alternative and augmentative communication can benefit from modern text-based artificial intelligence methods and how in return modern text-based artificial intelligence methods can benefit from alternative and augmentative communication. The aim is to create multimodal and multilingual models (e.g. texts, images, pictograms...) based on neural networks exploiting transforming architectures. To do this, the team in Grenoble will benefit from its experience in building such models for written and spoken language as well as from the GPU computing grids available in France.

The candidate will create flexible and configurable prototypes in order to engage with participants with intellectual disability. The prototype will be trialed with people with intellectual disability as part of the thesis, and refined based on the preferences and usage of research participants. Targeted AAC Applications could be automatic organization of pictogram grids, speech/text to picto, automatic design of visual scenes.

Supervisors: Didier Schwab (UGA), Laurianne Sitbon (QUT) & Rodrigue Cabrerat (UGECAM Rhône-Alpes)

Research Fields: Speech and Natural Language Processing, Semantics, Human-Computer Interaction

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3. Employment Benefits and Conditions

The Université Grenoble Alpes offers a 36-months full-time work contract (with the option to extend up to a maximum of 42 months). There is a probation period of 2 months and the total working hours per week is 36h40.

The remuneration, in line with the European Commission rules for Marie Skłodowska-Curie grant holders, will consist of a gross annual salary of 28,647 EUR. Of this amount, the estimated net salary to be perceived by the Researcher is 1,918.83 EUR per month. However, the definite amount to be received by the Researcher is subject to national tax legislation.

Benefits include

- Becoming a Marie Skłodowska-Curie fellow and be invited to join the Marie Curie Alumni Association.
- Access to all the necessary facilities and laboratories at Université Grenoble Alpes and Queensland University of Technology.
- Tuition fees exemption or sponsorship at both PhD awarding institutions.
- Yearly travel allowance to cover flights and accommodation for participating in AUFRANDE events.
- 10,000 EUR allowance to cover flights and living expenses for 12 months in Australia.
- 45 days paid holiday leave.
- Sick leave.
- Parental leave.

4. PhD enrolment

Successful candidates for this position will be enrolled by the following institutions and must comply with their specific entry requirements, in addition to AUFRANDE's conditions.

Applicants must hold a diploma conferring the degree of Master's at the end of a training programme establishing the aptitude for research (AQF Level 9) including:

- a significant research component, normally 25% or more of the credit point value; and
- a minimum grade point average of 5 (on a 7 point scale) in that course; and
- present evidence of research experience and potential for approval.

Applicants must demonstrate a level of English proficiency equivalent to an overall IELTS Academic score above 6.5. Tests must be taken no more than 2 years prior to the course commencement.

More information on Université Grenoble Alpes' requirements

Applicants holding a foreign diploma should request an exemption from the Master's degree.

Visit the website: https://doctorat.univ-grenoble-alpes.fr/preparing-a-phd/doctorate-enrolment/apply-and-register-in-doctoral-school-890537.kjsp?RH=1611137559271

More information on Queensland University of Technology's requirements

Applicants should check the course entry requirements, where they will find a specialised guide to countries and qualifications which meet QUT's requirements.

QUT accepts English language proficiency scores from the following tests.

English Test	Overall	Listening	Reading	Writing	Speaking
PTE Academic/PTE Academic Online	58	50	50	50	50
Cambridge English Score	176	169	169	169	169
IELTS Academic / IELTS Online	6.5	6	6	6	6
TOEFL iBT / Home / Paper	79	16	16	21	18

Short-listed applicants will need to submit an online application at QUT.

For more information and details on how to apply to QUT:

How to apply: https://www.qut.edu.au/research/study-with-us/how-to-apply

Admission Criteria for the Doctor of Philosophy:

https://cms.qut.edu.au/__data/assets/pdf_file/0015/640320/qut-admission-criteria-doctor-philosophy.pdf

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