

**Master thesis at JOANNEUM RESEARCH – HEALTH in cooperation with the  
Institute of Interactive Systems and Data Science (TU Graz) and the association  
for quality in geriatrics and gerontology (QIGG):**

## **Development and validation of a hybrid decision model to identify frailty in older adults with care needs in geriatric care facilities**

JOANNEUM RESEARCH Forschungsgesellschaft mbH develops solutions and technologies for businesses and industries across a wide range of sectors and conducts top-level research at an international level.

HEALTH – Institute for Biomedicine and Health Sciences – provides a link between basic medical research and industrial application. By forming strategic partnerships with both regional and international partners in the scientific and industrial sectors, HEALTH develops comprehensive, interdisciplinary solutions to problems encountered in the fields of medicine, pharmacy, medical technology and health care research.

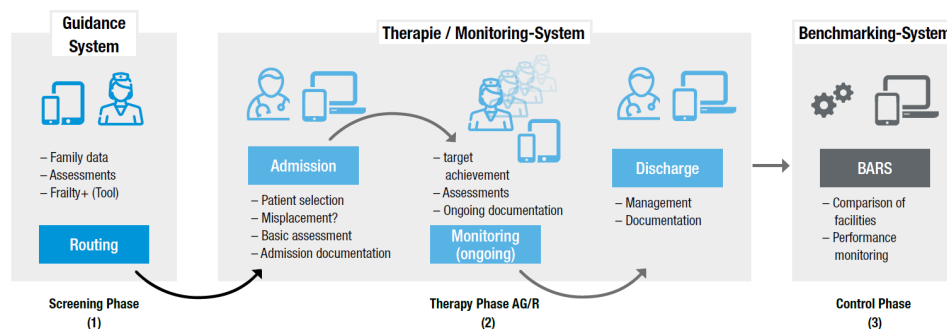
To strengthen our team in Graz, we are looking for a

### **Master student**

based on part-time employment of 60%.

The master thesis is carried out in a project funded by Gesundheitsfonds Steiermark and Gesundheitsfonds Kärnten.

**Background:** In order to further improve quality assurance in acute geriatrics and remobilization facilities (AG/R), a system for „benchmarking and reporting in acute geriatrics facilities“ (BARS, [www.healthgate.at](http://www.healthgate.at)) that has been in use for more than 10 years is being newly specified and developed. This new development is being linked with innovative eHealth systems for process and decision support (see illustration).



*Illustration of the three linked subsystems.* The Guidance System (1) outside the AG/R helps to identify geriatric patients, the Therapy/Monitoring System (2) inside the AG/R supports the documentation of geriatric assessments. The collected data is then automatically transferred to the Benchmarking System (3), which can be used for performance control and for comparison with other facilities.

One part of this new development deals with the development of a process-integrated patient guidance system to identify frail patients with care needs in geriatric care facilities.

**The aim of this master thesis** is the development and validation of a hybrid decision model for the identification of frail patients. The model to be developed accesses the following data sources:

1. Classical phenotypic classification according to Fried et al. (2001)
2. Classification based on ICD-10 diagnoses according to Gilbert et al. (2018)
3. Classification using a data-driven approach. A quality-assured data set with over 100,000 patient stays from the existing benchmarking system is available for model development.

Predictors for a successful outcome of a stay in a geriatric care facility are to be identified for model building. Since the decision model is to be used in the routine in the future, a process-integrated and timesaving approach must also be emphasized.

The following research questions should be clarified in the course of this master thesis:

- Literature search: How are current classification instruments for the frailty syndrome to be categorised? What are the strengths and weaknesses of current approaches?
- Can the reported classification tools be applied to the available data set (100,000 patient stays)? What are the applicable metrics for model assessment?

The master thesis is divided into the following phases:

- Requirements analysis and data preparation
- Explorative data analysis and modelling
- Iterative prototypical development
- Validation of the proof-of-principle

**We offer:**

- Interdisciplinary team (technical and clinical)
- Unique working environment with proximity to the clinic
- Qualified supervision during all phases of the master thesis (JOANNEUM RESEARCH: DI Dr. Klaus Donsa, TUG: Univ.-Prof. DI Dr. Matthias Böhm, Verein 'Qualität in der Geriatrie und Gerontologie – QiGG': Prim. Peter Mrak)
- 60% part-time employment at JOANNEUM RESEARCH for 8 months with a proportionate monthly salary of € 831 gross 14x per year

**We expect:**

*Technical requirements:*

- Background in relevant technical studies (Biomedical Engineering, Computer Science, Software Development, eHealth etc.)

- Experience with statistical methods and statistical modelling (R or Python)
- Experience with databases (SQL)
- Programming knowledge (Java, HTML)
- Experience using common development tools (GIT, Maven, Eclipse/IntelliJ IDEA)

*Personal requirements:*

- Communicative competence and ability to work in a team
- Independent and organized way of working

We look forward to receiving your application and ask you to send relevant documents (certificates, curriculum vitae and letter of motivation) – preferably in electronic form – to the following address:

JOANNEUM RESEARCH Forschungsgesellschaft mbH

HEALTH – Institut für Biomedizin und Gesundheitswissenschaften

E-Mail: [PEMBewerbungen@joanneum.at](mailto:PEMBewerbungen@joanneum.at)