15 PhD positions in the EU Horizon 2020 Marie Skłodowska-Curie Project:

CHARMING

Applications are invited for 15 PhD positions ("Early Stage Researchers") to be funded by the Marie-Sklodowska-Curie Innovative Training Network within the Horizon 2020 Programme of the European Commission. CHARMING is the "European Training Network for Chemical Engineering Immersive Learning". CHARMING has pooled the interdisciplinary and intersectoral expertise of leading universities and companies in the fields of chemical technology, instructive psychology and immersive technologies, located in Belgium, Germany, the Netherlands, UK, Denmark and France (**Figure 1**). The 15 CHARMING ESRs will not only receive state-of-the-art science/technology training but will also benefit from a unique soft-skills training programme. This will kick-start their careers as highly employable professionals in the EU's chemicals industry, games/VR/AR sector and the fields of e-learning and digital human resource management, as well as for teaching & scientific organisations and public bodies.

Key dates

- 30-6-2018: Launch 15 ESR positions
- 15-10-2018: Deadline for on-line application
- 30-10-2018: Circulation list "preselected candidates"
- 13-11-2018: CHARMING Recruitment Event
- 20-11-2018: Circulation list "recruited CHARMING ESRs".
- December 2018 – April 2019: Targeted starting date for ESR contracts

Key background info

Number of positions available
15 PhD Positions

Research Fields
Interdisciplinary research on the bridges between 1) Chemistry and Chemical Engineering, 2) instructional psychology and pedagogy, and 3) immersive technologies like games, augmented reality and virtual reality. Potential candidates should be proficient in one of these three fields and have clear interest in the two others.

Keywords
Chemistry and Chemical Engineering, Instructional Psychology, Pedagogical Technology, Gaming, VR/AR

Career Stage
Early Stage Researcher (ESR) or 0-4 yrs (Post Graduate)

Benefits and salary
The successful candidates will receive an attractive salary in accordance with the MSCA regulations for Early Stage Researchers. The exact (net) salary will be confirmed upon appointment and is dependent on local tax regulations and on the country correction factor (to allow for the difference in cost of living in different EU Member States). The salary includes a living allowance, a mobility allowance and a family allowance (if married). The guaranteed PhD funding is for 36 months (i.e. EC funding, additional funding is possible, depending on the local Supervisor, and in accordance with the regular PhD time in the country of origin). In addition to their individual scientific projects, all fellows will benefit from further continuing education, which includes internships and secondments, a variety of training modules as well as transferable skills courses and active participation in workshops and conferences.

On-line Recruitment Procedure (see Appendix 1)
All applications proceed through the on-line recruitment portal on the www.charming-etn.eu website. Candidates apply electronically for one to maximum three positions and indicate their preference. Candidates provide all requested information including a detailed CV (Europass format obligatory) and motivation letter. During the registration, applicants will need to prove that they are eligible (cf. ESR definition, mobility criteria, and English language proficiency). The deadline for the on-line registration is **15 October 2018**. The CHARMING Recruitment Committee selects between 20 and maximum 30 candidates for the Recruitment Event which will take place in Leuven, Belgium (**13 November 2018**). The selected candidates provide a 20 minute presentation and are interviewed by the Recruitment Committee. Candidates will be given a domain-relevant peer-reviewed paper (prior to the recruitment event) by their prioritised Supervisor and will be asked questions about this paper during the interview to check if the candidate has the right background/profile for the ESR position. Prior to the recruitment

event, skype interviews between the Supervisors and the candidates are recommended, along with on-line personality tests. In order to facilitate their travel, preselected candidates (from outside Belgium) receive a fixed, lump sum of 250 euro (paid by the prioritised Supervisor). In order to avoid delays in reimbursements, candidates are asked to keep all invoices and tickets (cf. train, plane, hotel…). The final decision on who to recruit is communicated on 20 November 2018). The selected ESRs are to start their research as quickly as possible (December 2018 - April 2019).

Applicants need to fully respect three eligibility criteria (to demonstrated in the Europass cv):
Early-stage researchers (ESR) are those who are, at the time of recruitment by the host, in the first four years (full-time equivalent) of their research careers. This is measured from the date when they obtained the degree which formally entitles them to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the research training is provided, irrespective of whether or not a doctorate was envisaged.
Conditions of international mobility of researchers:
Researchers are required to undertake trans-national mobility (i.e. move from one country to another) when taking up the appointment. At the time of selection by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account.
English language: Network fellows (ESRs) must demonstrate that their ability to understand and express themselves in both written and spoken English is sufficiently high for them to derive the full benefit from the network training.

The 15 available PhD positions

(see **Figure 2** for interactions between ESRs/WPs)

ESR1: Chemistry and chemical-engineering concepts for kids
Host: KU Leuven (Belgium)
Lead Supervisor: Prof. Ilse Smets (KU Leuven, ilse.smets@kuleuven.be)
Duration: 36 months
Required profile: Chemical engineer or Chemist with interest in games and pedagogy
Objectives: To translate fundamental chemical-engineering concepts and mechanisms into intuitive activities embedded in a game environment. To develop generic game concepts, game scenarios and one specific paper prototype for an educational game for 8 to 14 year old kids.

ESR2: Stimulating chemistry curiosity through virtual experiences
Host: LuGus Studios (Belgium)
Lead Supervisor: Kevin Haelterman (LuGus Studios, kevin@lugus-studios.be), Prof. Ilse Smets (KU Leuven, ilse.smets@kuleuven.be)
Duration: 36 months
Required profile: Game developer with interest in technology and pedagogy
Objectives: To develop a comprehensive set of realistically implementable design and production guidelines for a "curiosity lab", an interactive virtual environment that can function in a domestic context. To allow children to experiment safely, freely, and in a home atmosphere, in order to encourage experimentation and curiosity at an early age as a foundation for more formal education at older age.

ESR3: Chemistry and chemical engineering interest development
Host: Utrecht University (The Netherlands)
Lead Supervisor: Prof. Liesbeth Kester (Utrecht University, l.kester@uu.nl)
Duration: 36 months
Required profile: Educational scientist, Educational/ developmental psychologist or Pedagogist with interest in STEM and learning technology
Objectives: To investigate how interest for chemistry and chemical engineering can be stimulated at an early age in a diverse target group and how it can be sustained during the transition from primary to secondary school education.

ESR4: Educational game design for intuitive chemical engineering
Host: IT University of Copenhagen (Denmark)
Lead Supervisor: Prof. Daniel Cermak-Sassenrath (ITU Copenhagen, dace@itu.dk)
Duration: 36 months
Required profile: Game designer, with additional demonstrated interests in chemistry, media studies, pedagogy and/or psychology
Objectives: To create an educational game to interest children in chemistry and chemical engineering. To use popular platforms and social networks with features of team-play, co-location, high replayability, open learning and accommodating different popular playing styles in the chemical-engineering discipline, allowing equal access.

ESR5: An AR lab for general and technical chemistry
Host: KU Leuven (Belgium)
Lead Supervisor: Prof. Peter Van Puyvelde (KU Leuven, peter.vanpuyvelde@kuleuven.be)
Duration: 36 months
Required profile: Chemical engineer, Bio-engineer or Chemist with interest in games and pedagogy
Objectives: To develop AR concepts to couple theoretical chemical concepts with practical chemical experiences.

ESR6: Playing process intensification with external energy forms
Host: KU Leuven (Belgium)
Lead Supervisor: Prof. Tom Van Gerven (KU Leuven, tom.vangerven@kuleuven.be)
Duration: 36 months
Required profile: Chemical engineer, Mechanical Engineer or Physicist with interest in games and pedagogy
Objectives: To apply CFD models and databases for chemical-model based AR/VR design. To develop AR/VR concepts, scenarios and paper prototypes for a sono- and photoreactor case. To develop generic guidelines for the integration of reactor models in an AR/VR environment.

ESR7: Playing process intensification with multifunctional reactors and hybrid separators
Host: KU Leuven (Belgium)
Lead Supervisor: Prof. Tom Van Gerven (KU Leuven, tom.vangerven@kuleuven.be)
Duration: 36 months
Required profile: Chemical engineer with interest in games and pedagogy
Objectives: To apply flow sheet models and databases for chemical-model based AR/VR design. To develop AR/VR concepts, scenarios and paper prototypes for a reactive and hybrid separation case. To develop generic guidelines for the integration of flow sheet models in an AR/VR environment.

ESR8: Instructional psychology for pupils and students Host: Utrecht University (The Netherlands)
Lead Supervisor: Prof. Liesbeth Kester (Utrecht University, l.kester@uu.nl)
Duration: 36 months
Required profile: Educational scientist, Educational/ developmental psychologist or Pedagogist with interest in STEM and learning technology
Objectives: To investigate how interest, enjoyment and learning can be fostered by finding the balance between representational learning content and engaging gameplay in a game-based learning environment for chemistry and chemical engineering in secondary school education with attention for different learner characteristics.

ESR9: A learner's game making strategy for ChemEng students
Host: IT University of Copenhagen (Denmark)
Lead Supervisor: Prof. Daniel Cermak-Sassenrath (ITU Copenhagen, dace@itu.dk)
Duration: 36 months
Required profile: Game designer, with additional demonstrated interests in chemistry, media studies, pedagogy and/or psychology
Objectives: To implement game-making as an asset in open learning. To facilitate learners' game-making to create a trans-media casual game. To use sensors for in-game mechanics. To provide hands-on intuitive access to chemical practices. To accommodate popular playing styles in educational games. To incorporate equity-promoting tools.

ESR10: E-evaluation of ChemEng students
Host: University of Newcastle (UK)
Lead Supervisor: Prof. Jarka Glassey (University of Newcastle, jarka.glassey@newcastle.ac.uk)
Duration: 36 months
Required profile: Chemical engineer with interest in psychology and games
Objectives: To develop and test methods for evaluating individual learning gain of students during a team game-based environment. To refine methods of evaluating the effectiveness of teaching core knowledge via gaming approaches.

ESR11: HSE Training through a serious game
Host: ARKEMA (France)
Lead Supervisor: Dr. J.L. Dubois (Arkema, jean-luc.dubois@arkema.com), Prof. Tom Van Gerven (KU Leuven, tom.vangerven@kuleuven.be)
Duration: 36 months
Required profile: Chemical engineer or Chemist with interest in psychology and games
Objectives: To create a specific training game for HSE culture in an industrial context.

ESR12: Digital training of chemical operators
Host: Merck (Germany)
Lead Supervisor: Dr. Michael Wilk (Merck, michael.wilk@merckgroup.com), Prof. Jarka Glassey (University of Newcastle, jarka.glassey@newcastle.ac.uk)
Duration: 36 months
Required profile: Chemical engineer or Chemist with interest in psychology
Objectives: To understand the educational value of gaming applications for chemical operators, thereby differentiating education vs. in-training as well as the effects on digital natives vs digital immigrants.

ESR13: Self learning of gaming employees
Host: Utrecht University (The Netherlands)
Lead Supervisor: Prof. Liesbeth Kester (Utrecht University, l.kester@uu.nl)
Duration: 36 months
Required profile: Educational scientist, Educational/ developmental psychologist or Pedagogist with interest in STEM and learning technology, in particular VR/AR/games
Objectives: To investigate how lifelong learners, digital natives as well as digital immigrants, can be supported by learning analytics that enable them to make informed decisions about their learning process.

ESR14: Assess your employee in a game
Host: University of Newcastle (UK)
Lead Supervisor: Prof. Jarka Glassey (University of Newcastle, jarka.glassey@newcastle.ac.uk)
Duration: 36 months
Required profile: Chemical engineer with interest in psychology and VR/AR/games
Objectives: To evaluate adapted situational judgment based assessment of operator performance following exposure to the gaming environment. To develop robust metrics of measuring professional skill development and threshold concept change for the purposes of continuous professional development.

ESR15: Immersive VR training for the operation of chemical reactors
Host: CITEC, Bielefeld University (Germany)
Lead Supervisor: Dr. Thies Pfeiffer (Bielefeld University, thies.pfeiffer@uni-bielefeld.de)
Duration: 36 months
Required profile: AR/VR expert with interest in chemical technology, psychology, education and/or pedagogy
Objectives: To explore the use of immersive VR/AR training simulators for the advanced training of employees in the chemical industry.

ETN CHARMING project abstract and key project information

The chemical industry in Europe faces stiff competition as it fights to strengthen its position in the global market place. Europe's greatest asset is its human capital, but the people working in such a technology-based environment, with the rise of the "smart factories" of Industry 4.0, need to be very well qualified. The situation of yesteryear, where a person could be trained to carry out a job for the whole of his/her career has long since gone; now the situation is one of developing skills and competencies, but then being able to adapt, re-learn and be able to cross sectors and disciplines in a world of work that is dynamic and subject to constant change. Continuous professional development, the stimulation of creative thinking and the motivation of youngsters for science & technology are high on the EU's agenda. Recent developments in immersive learning technologies are providing exciting new tools for teaching and training programmes, yet they remain underutilised in science & technology education, and nowhere is this more true than in the field of chemistry and chemical engineering. **CHARMING**, the European Training Network for **CH**emic**A**l Engine**R**ing I**M**mersive Learn**ING**, takes on this challenge by developing learning strategies, content and prototypes for the application of games and virtual/augmented reality for motivating, teaching and training children, students and employees in chemistry, chemical engineering and chemical operations. The inter-sectorial and interdisciplinary CHARMING ETN consists of leading universities and industry participants and trains 15 ESRs in the areas of innovative chemical engineering, instructional psychology & pedagogy and immersive technology. CHARMING's success is based on integrating these three areas in order to provide Europe with its highly trained young experts who are ready to help motivating, training and integrating the next-generation human capital of the European chemical industry and beyond.

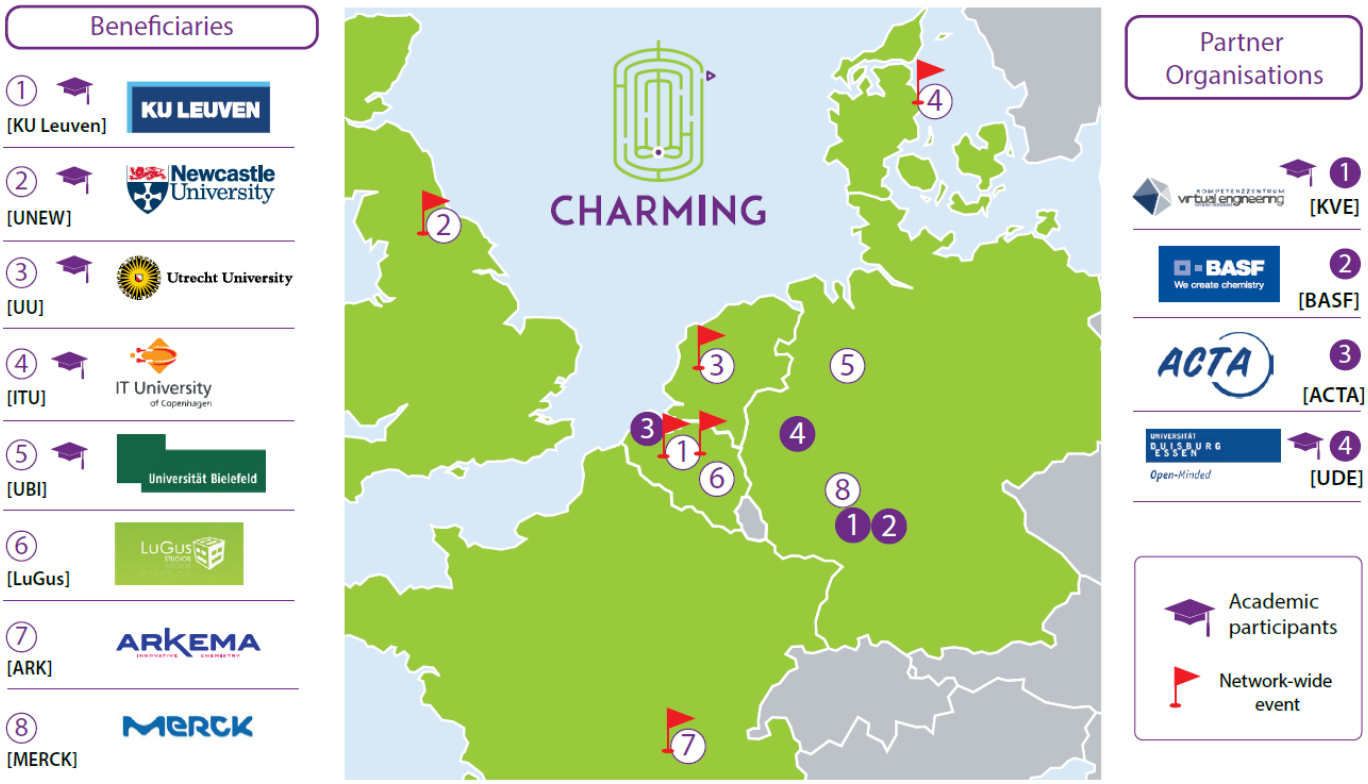

Figure 1: CHARMING Consortium

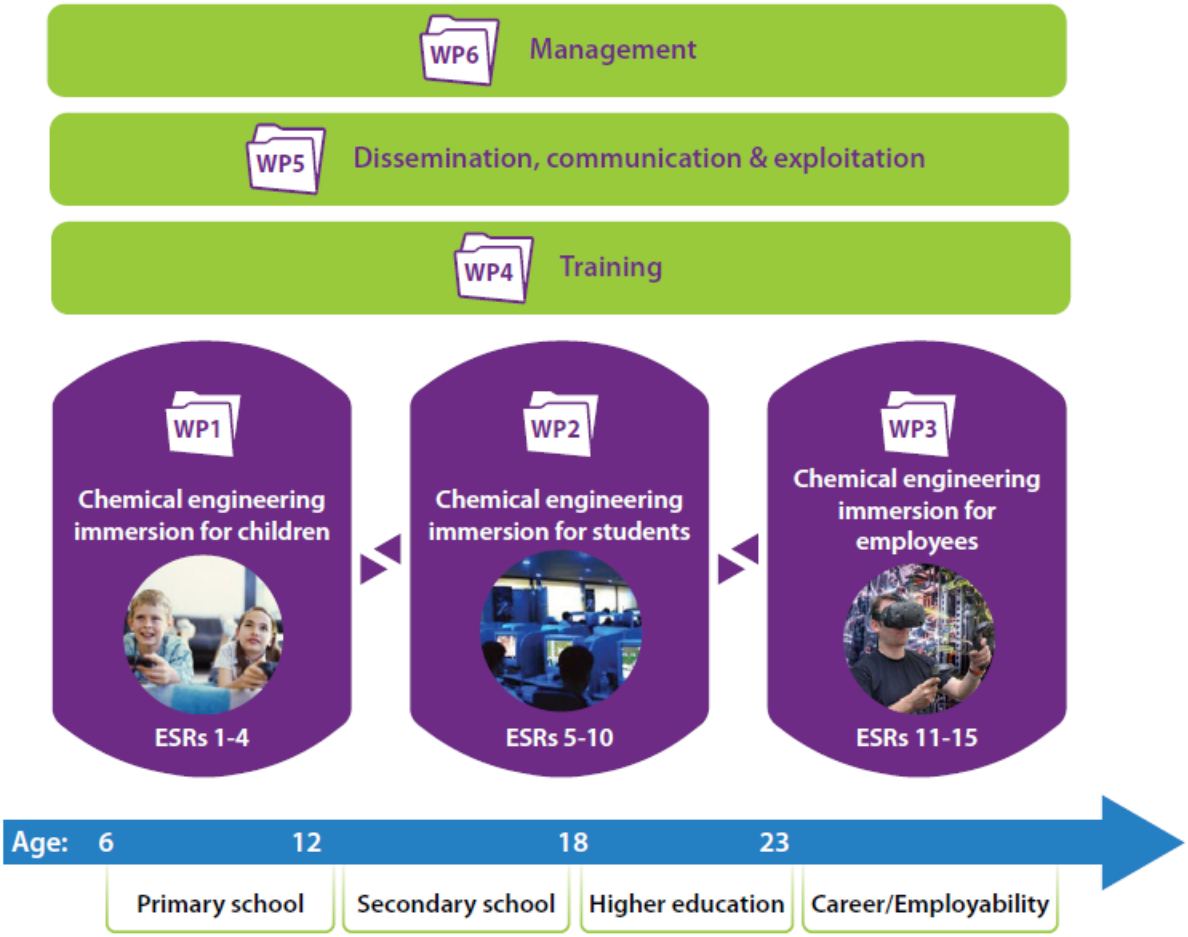

Figure 2: CHARMING WPs and ESRs

General coordinator for ETN CHARMING:
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General contact person for ETN CHARMING:
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Appendix 1: Recruitment Procedure and Principles

A preliminary CHARMING recruitment web page is put on-line (June 2018). To attract the right students, the required profiles are clearly listed for each ESR position.

Applications are made through an on-line, eligibility-proof form on the CHARMING recruitment webpage. The candidates apply for a maximum of three specific ESR positions and list their order of preference. The Supervisors provide the names of their preferred candidates to the RC, which in its turn produces a short list of candidates: 2 per position. As such a maximum of 30 ESRs (from an initial pool of 120-200 candidates) are invited to the Recruitment Event (13 November 2018), which coincides with the pre-kick--off meeting (Leuven).

Each candidate gives a presentation and is interviewed by the RC. Candidates will be given a domain-relevant peer-reviewed paper (prior to the recruitment event) by their prioritised Supervisor and will be asked questions about this paper during the interview to check if the candidate has the right background/profile for the ESR position. Prior to the recruitment event, skype interviews between the Supervisors and the candidates are recommended, along with on-line personality tests.

After a thorough evaluation during the Recruitment Event, the candidates are ranked and a collective decision is made. In this way a complementary team of ESRs can be assembled, as positively experienced from previous ETN recruitment events.

In case not all 15 ESRs can be recruited during the collective Recruitment Event, the recruitment procedure is “decentralised”, meaning that the involved supervisors continue the search for good candidates. The GC is kept informed at all times when new eligible candidates appear. The GC makes an official complaint in case the Code of Conduct for the Recruitment of Researchers is breached. The involved supervisor is then expected to find another candidate. Recruitment problems are also, if still needed, discussed during the RC meeting (M6, M12) in order to deliver specific action plans to target specific networks relevant for the vacant ESR positions.

All details concerning the recruitment-procedure principles are communicated on the on-line application portal, so that potential ESRs know exactly what to expect and are stimulated to apply. All recruitment (pre and final selection) is in line with the European Charter for Researchers, providing the overarching framework for the roles, responsibilities of both researchers and employers. The Code of Conduct for the Recruitment of Researchers functions ensures that the selection procedures are transparent and fair.

The recruitment strategy of CHARMING fully complies with the Code of Conduct definition of merit. For example, merit is not just measured by a researcher’s grades, but on a range of evaluation criteria, such as teamwork, interdisciplinary knowledge, soft skills and awareness of the policy impact of science.

The RC has members of each gender and considers the promotion of equal opportunities and gender balance as part of the recruitment strategy.

In order to facilitate their travel, selected candidates (from outside Belgium) receive a fixed, lump sum of 250 euro (paid by the prioritised Supervisor). In order to avoid delays in reimbursements, candidates are asked to keep all invoices and tickets (cf. train, plane, hotel…).

CHARMING aims at a participation of 50% female ESRs in the network. Researchers are employed on fixed-term contracts and are registered as staff candidates for PhD degrees. Therefore, they are entitled to pension contributions, paid holidays, and other benefits as governed by the universities and industrial companies.

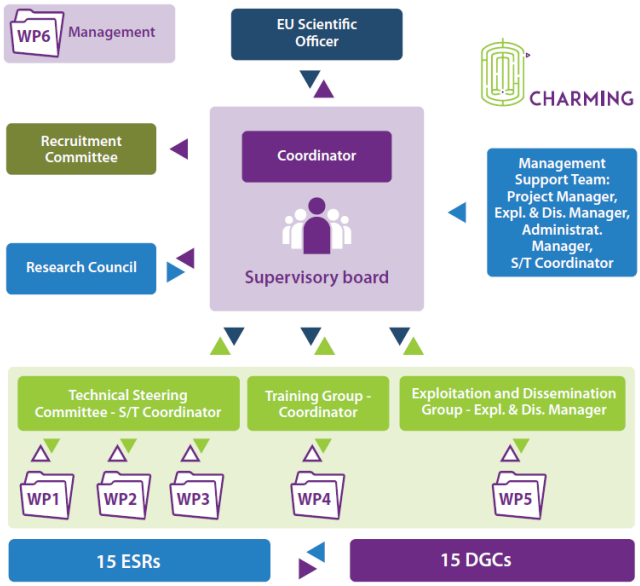

Figure 3: CHARMING Governance

Recruitment Committee = This committee involves the General Coordinator and one representative per Beneficiary (I. Smets, J. Glassey, L.Kester, D. Cermak-Sassenrath, Th. Pfeiffer, K. Haelterman, O.Ulrich, M. Wilk). Its goal is to oversee the recruitment of the 15 ESRs during the collective recruitment event. During the recruitment event additional Supervisors may be present.