



# **MELGEN TRAINING PROGRAMME**

## **2016 - 2018**

**Dissemination Level: Public**

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### **1 Introduction**

The MELGEN training programme encompasses individual projects that incorporate training-through-research, personal career development plans and a research/training multidisciplinary supervisory team. The ESRs will also benefit from secondments, ETN-wide complementary skills training and specific skills training.

The MELGEN training programme will:

- Deliver comprehensive, high quality training, which is both interdisciplinary and inter-sectorial to the benefit of the students and companies involved.
- Use the expertise within the research consortium, including the world leading Sanger Institute (GRL), to deliver superior training in cancer research involving human genetics.
- Provide exceptional genomics expertise strongly coupled with training in statistics and bioinformatics.
- Train in the use of large-scale genetics to understand the genetic determinants underlying immunological processes.
- Demonstrate the value of open collaboration and effective team working across Europe, establishing this as the norm for trainees in the future.
- Improve the career prospects of all MELGEN ESRs via training designed to promote an entrepreneurial mind-set, thereby improving competitiveness of European industry and academia.
- Complement scientific education with appropriate skills for public engagement and working in an increasingly digital world.
- Teach approaches to Intellectual Property Rights (IPR) management.
- Support acquisition of scientific knowledge with transferable and complementary skills.
- Establish structured training programmes as the model for the future (Figure 1)



Figure 1: MELGEN's key training strands based upon IDT Principles<sup>1</sup>

Whilst training is largely delivered either via the MELGEN ETN-wide training or through individualised training at the host institution of the ESR, MELGEN emphasises the need for collaborative thought and exchange of ideas between MELGEN ESRs from different backgrounds and specialities. Additionally MELGEN recognises that exchange of knowledge between the ESRs and researchers from outside of MELGEN should be actively encouraged. In order to promote this collaborative atmosphere attendance at the annual meeting of the parent consortia GenoMEL and BioGenoMEL forms part of the compulsory training schedule. GenoMEL meetings operate under an agreement of strict confidentiality thus allowing the ESRs the opportunity to present, via oral and poster presentations, to the wider consortia in a forum which encourages exchange of preliminary and unpublished data. Additionally research workshops are appended to the GenoMEL meetings in Years 2 and 3 of the grant agreement. These provide opportunities to present data to a wider audience including patient advocacy groups and the general public.

MELGEN also recognised the importance of forging links with industry and consequently each ESR will undergo up to 10 months secondment at one of MELGEN's largely commercial partners during years 2 and 3 of their project. In addition modules of the ETN-wide training will be delivered and hosted by commercial partners (GenomeScan, formally ServiceXS; Eagle Genomics; Digitronix). The location and timing of secondment will be tailored to the needs of the individual ESR and their project.

Of equal importance is personal career development. Consequently ESR career development plans will be developed by the student and their supervisors alongside their overall plan of training, with the additional contribution from a Research Mentor; an independent scientist appointed from within each University. The mentor will give support where necessary with the training and career plan, working patterns and any personal difficulties.

<sup>1</sup> Page 15, Exploration of the implementation of the Principles for Innovative Doctoral Training in Europe Final Report, European Commission, reference ARES (2011) 932978 available at: [http://ec.europa.eu/euraxess/pdf/research\\_policies/IDT%20Final%20Report%20FINAL.pdf](http://ec.europa.eu/euraxess/pdf/research_policies/IDT%20Final%20Report%20FINAL.pdf)

The training schedules outlined in this report are broken down into training which will be delivered on an ETN-wide basis through a series of residential courses and research workshops and individual training plans intended to supplement and extend the baseline training delivered by the ETN.

## **2 Central MELGEN ETN Training**

The MELGEN ETN training is designed to give each student a comprehensive baseline level of training that can be extended and further supplemented by additional individualised training and career development plans. The ethos behind the course structure programme is the belief that skills are best developed over a period of time with staged inputs, and multiple practice and feedback opportunities. In year 1 complementary skills training (CST) addresses the key communication, personal and project management skills required by future research leaders. It focuses on building understanding, skills and confidence by covering time management, problem solving, leadership and assertiveness. In particular it examines PhD project planning and different cultures within research groups, institutions and countries.

There is an ethical component of the training that runs through all three years. Digital Native (DN) sessions in the first year will introduce the ESRs to the MELGEN website and their dedicated, protected forum within it. The attendees will then explore the digital media opportunities presented by the worldwide web putting their knowledge in practice by creating and maintaining their own research blogs. In year 2 the focus moves to presentation skills in their broadest sense. The emphasis is on practice and acting on feedback, justifying allocating 3 days to these activities. The network is essentially a biomedical ETN working on human samples or data derived from those human samples. The regulatory imperatives are to work within European regulations on handling human tissue and data. There will be a half-day session devoted to this in addition to local e-learning or face to face training packages. In year 3 the ESRs come together for sessions on writing up research for publication and planning their future careers. The DN session will conclude their training in managing their digital identity, blogging, wikis and other forms of online collaboration. These sessions are based on successful courses that have been run in the past by the University of Leeds, including training for previous ITNs. Leeds has EU HR in Excellence accreditation, recognising the excellent career development provision for employees of the university at all stages of their careers.

Two annual research workshops will allow practice in presenting data, and will produce benefits from constructive criticism within the group. Work will be largely presented by the ESRs but with attendance from the whole of MELGEN and presentations from supervisors. The related research consortia, GenoMEL ([www.genomel.org](http://www.genomel.org)) and BioGenoMEL ([www.biogenomel.eu](http://www.biogenomel.eu)) have 1 to 2 meetings per year and the MELGEN workshops will be appended to the consortium research meetings allowing attendance at both. This will facilitate exposure to the science being developed across both consortia and for consortia members to all ESRs' research outputs and increase the attendance of geneticists working within a wider field.

A key feature underpinning all the training delivered on an ETN-wide basis is the ability to disseminate the work generated in MELGEN to a wider audience, both at scientific and publically accessible levels.

Thus the complementary skills training delivered across the 3 years will be practically applied via management of the MELGEN website ([www.melgen.org](http://www.melgen.org)), maintenance of a research blog, generation of on-line teaching materials for use in schools (including delivery of the materials directly via visits to schools), and presentation of data to patient advocacy groups and the general public via the annual research workshops described above.

Table 1 below details the content and planned timing of the centrally delivered MELGEN ETN training events which all the ESRs will attend. The content of some elements of some courses (e.g. Statistics and Bioinformatics) delivered may change to take account of the needs of the developing projects of the MELGEN ESRs, however the key goals identified and hours of study will not change.

The content of the training programme will be reviewed in early 2017 and an updated version of this document made available.

*Table 1: The detailed programme of training delivered to all 17 MELGEN students across the 3 years of the MELGEN ETN 2016-2019.*

Dates	Training Course	Delivered by:
18/01/2016 - 28/01/2016 53.75 hours 2.69 ECTS	<p><b>Residential Introduction to Genomics Course for Early Stage Researchers:</b></p> <ul style="list-style-type: none"> <li>• Module 1 - Key Aspects of Melanoma: germline susceptibility, the role of the tumour, and emerging treatments               <ul style="list-style-type: none"> <li>○ The Methodology of Determining Melanoma Susceptibility</li> <li>○ Somatic Genomics: The Importance of the Tumour</li> <li>○ Melanoma treatment: the way forward</li> </ul> </li> <li>• Module 2 - Exploring State of The Art Genomic Technologies               <ul style="list-style-type: none"> <li>○ Introduction to the Laboratory</li> <li>○ Next Generation Sequencing: From Theory to Data Analysis</li> <li>○ Other Technologies incl. Microfluidics and melting curve analysis</li> </ul> </li> <li>• Module 3 - Statistics and Bioinformatics Training Course 1               <ul style="list-style-type: none"> <li>○ Study design (including sample size and power, bias, confounding)</li> <li>○ Quality control</li> <li>○ Probability and random variation</li> <li>○ Probability distributions and data transformation</li> <li>○ Exploratory data analysis (Data visualization, types of variable)</li> <li>○ Hypothesis testing incl. most common tests, parametric and non-parametric tests, multiple testing, examples of differential gene expression/genetic association</li> <li>○ Unsupervised learning (e.g. cluster analysis of gene expression levels)</li> <li>○ Prediction modelling incl. regression (including linear, logistic), multivariable analysis, survival analysis, over-fitting, classification methods such as Random Forest</li> </ul> </li> </ul>	GenomeScan LUMC Eagle UNIVLEEDS

<b>Dates</b>	<b>Training Course</b>	<b>Delivered by:</b>
11/04/2016 - 13/04/2016 18 hours 0.9 ECTS	<b>GenoMEL/BioGenoMEL Conference (Leeds)</b> <ul style="list-style-type: none"> <li>• Presentations delivered by melanoma experts from renowned experts in the field of melanoma research</li> <li>• Opportunity for ESR presentations within context of main conference</li> <li>• Poster presentation from all students</li> </ul>	
14/04/2016 - 19/04/2016 24 hours 1.2 ECTS	<b>Residential Complementary Skills Training Course 1.</b> <ul style="list-style-type: none"> <li>• CST 1. Successfully starting a research project (3 hrs)</li> <li>• CST 2. How to be an effective researcher and project planning (6 hrs)</li> <li>• CST 3. Effective poster presentations workshop (3 hrs)</li> <li>• CST 4. Giving effective seminar and conference presentations (3 hrs)</li> <li>• CST 6. Data protection and working with human subjects (3 hrs)</li> <li>• DN 1. Creating and managing a digital profile (6 hrs)</li> </ul>	UNIVLEEDS Digitronix
15/05/2017 - 16/05/2017 12 hours 0.6 ECTS	<b>GenoMEL/BioGenoMEL Conference (Genoa)</b> <ul style="list-style-type: none"> <li>• Presentations delivered by melanoma experts from renowned experts in the field of melanoma research</li> <li>• Opportunity for ESR presentations within context of main conference</li> </ul>	
17/05/2017 6 hours 0.3 ECTS	<b>Research Workshop 1 linked to GenoMEL/BioGenoMEL conference</b> <ul style="list-style-type: none"> <li>• Intended to train ESRs in presentation skills, the value of collaboration, and to promote the exchange of information both resulting from overview talks given by senior researchers and in terms of facilitating constructive comment on ESRs' work.</li> <li>• There will be at least three presentations from senior BioGenoMEL members.</li> <li>• Presentations from ESRs, with prizes for the best presentation and the best poster presentation.</li> </ul>	
18/05/2017 - 19/05/2017 12 hours 0.6 ECTS	<b>Statistics and Bioinformatics Training Course 2</b> <ul style="list-style-type: none"> <li>• Designed to support PhD students to become competent in analysis of their own data using statistics and bioinformatics.</li> <li>• The course will comprise a mixture of lectures, interactive seminars and computer practical sessions.</li> <li>• The course will focus on the analysis of gene expression, copy number and deep sequencing data and tumour biology, and their application to studies of prognosis and response to therapy.</li> <li>• There will be lectures and practical sessions covering statistical techniques relevant to these analyses, including generalised linear modelling, cluster analysis, classification algorithms (e.g. Random Forest), and the development of risk prediction models.</li> <li>• Hands-on data analysis exercises based on DNA copy number and gene expression data as well as next generation sequencing data will be included.</li> </ul>	UNIVLUNDS UNIVLEEDS

<b>Dates</b>	<b>Training Course</b>	<b>Delivered by:</b>
10/07/2017 - 13/07/2017 24 hours (1.2 ECTS)	<b>Residential Complementary Skills Training Course 2</b> <ul style="list-style-type: none"> <li>• CST 7. Poster in progress – ‘clinic’ feedback session with opportunity to improve poster for poster session during residential with further feedback (3 hrs)</li> <li>• CST 9. PowerPoint techniques (3 hrs)</li> <li>• CST 11. Introduction to Effective Research Writing (3 hrs)</li> <li>• CST 13. MS Word for Thesis and other long documents (3 hrs)</li> <li>• CST 15. Ownership, Confidentiality and Secrecy in Research (3 hrs)</li> <li>• DN 2. How to make friends and influence people via the web (3 hrs)</li> <li>• Additional content addressed to developing project needs (6 hrs)</li> </ul>	UNIVLEEDS Digitronix
20/03/2018 - 22/03/2018 18 hours 0.9 ECTS	<b>GenoMEL/BioGenoMEL Conference (Essen)</b> <ul style="list-style-type: none"> <li>• Presentations delivered by melanoma experts from renowned experts in the field of melanoma research</li> <li>• Opportunity for ESR presentations within context of main conference</li> </ul>	
Date TBC 21/03/2018 12 hours 0.6 ECTS	<b>Research Workshop 2 linked to GenoMEL/BioGenoMEL conference</b> <ul style="list-style-type: none"> <li>• At least two presentations from senior GenoMEL members.</li> <li>• Presentations from ESRs, with prizes for the best presentation and the best poster presentation.</li> </ul>	
09/07/2018 - 11/07/2018 18 hours (0.9 ECTS)	<b>Residential Complementary Skills Training Course 3</b> <ul style="list-style-type: none"> <li>• CST 16. Writing-up Your Research for Publication and being interviewed by the media. To include advice on interacting with journal editors and responding to reviewers. (6 hrs)</li> <li>• CST 17. Career planning: know yourself. Interviews technique, mock Interviews, skill recognition and articulation, CVs and applications. (6 hrs)</li> <li>• CV Surgery – one to one (included in CST17 time allocation)</li> <li>• DN 3. IT skills for the future (3 hrs)</li> </ul>	UNIVLEEDS Digitronix