

# Final assessment of the MEDEA Early Stage Researcher programme

*Horizon 2020 Research and Innovation Programme; Marie Skłodowska-Curie grant agreement No. 641789.*

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## 1: Abstract

The final assessment of Early Stage Researcher (ESR) activities and development follows the trajectory as previously outlined by the MEDEA Mid-term report presented at the Aarhus meeting January 2017. The herein present follow-up consists of three recent activities:

- An ESR group statement of pros/cons/ requested activities (Lund meeting Sep 25<sup>th</sup> 2018).
- Individual ESR web survey ratings of each joint ESR statement (by Dec 3, 2018).
- Individual ESR exit interviews on development of research capacities (by Dec 20, 2018).

The ESR group statement and follow-up web survey confirm that MEDEA is a highly appreciated ESR programme that participants clearly would recommend for others to join. The disciplinary Crete Summer School was in particular highly rated, and the pedagogical Milano winter school was also strongly rated. The ESRs had however mixed feelings about the quality of the industrial Nice summer school activities. Medea networking, scientific collaborations, ESR journal clubs and webinar series were unanimously appreciated. The Marie Curie funding scheme and participant rights were equally appreciated. So, the overall picture is positive, although there are some areas of possible improvements: *“–In general I am very happy on how everything was handled and organized in MEDEA. I don't think any part needs a radical revision, but rather some minor incremental improvements” [anonymous MEDEA Early Stage Researcher].*

The expected extent of secondments was considered pressing and for some not adequately related to the individual research task. For others, secondments were clearly essential to reach their research objectives. The requirement to perform secondment in industrial work places also caused some mixed reactions among the ESRs, who agreed that a deeper supervisor engagement in secondment planning would be desirable. Equally, most ESRs found themselves alone organizing the MEDEA outreach activities (which mostly were appreciated when conducted). The compulsory career development plans were mostly regarded static although the MEDEA network as a whole was regarded highly supportive for the ESRs future careers. The ESRs also suggest some activities could have been added or expanded such as proposal-writing training and future academic career advice, along with an overall stronger involvement of local supervisors. There was also a useful suggestion that journal clubs could revolve more around ESRs journal papers and manuscripts during the later period of the network, when ESR research results are disseminated.

With some exceptions, the exit interviews showed that the ESRs mainly developed their core research skills and research output with the help of support in their own local workplaces, rather than during MEDEA collaborations. For the majority of the ESRs, the added-value of being a MEDEA member was 1) the development of a network for now and for the future, 2) being forced to a wider scientific breadth, 3) being well-supported (resources), and 4) in some instances that their performed research was developed in another partner lab with local support there.

## 2. Background

MEDEA is a European research network in the Horizon 2020 Research and Innovation Programme composed of academic and industrial partners that study molecular electron dynamics investigated with intense fields and attosecond pulses [1]. MEDEA runs a research school with 17 employed doctoral students (Early Stage Researchers; ESR:s), and the report at hand assesses the design and performance of planned and performed research school activities, including:

- Instructional videos
  - How-to-for-beginners video series (only assessed in the Mid-term report)
  - Virtual Lab visits video series (only assessed in the Mid-term report)
- Outreach Training (at the Milano Winter School)
- Outreach activities (using the Photonics Explorer Kit in schools)
- A continuous webinar lecture series (run by senior researchers)
- A continuous web-based journal club (run by the ESR:s)
- A research focussed Winter School (Crete)
- A Summer School in Nice focussed on industrial application of attosecond research
- A mobility program for the ESR:s including
  - A secondment at an academic partner laboratory
  - A secondment at an industrial partner laboratory

During the 3-year programme the number of ESRs has increased from 10 to 17. Each ESR has a yearly updated Career Development Plan (CDP) which outlines individual research milestones in relation to the MEDEA work packages, and that scheduled involvement in MEDEA training activities. An assessment of the activities has been reported in a Mid-term report (Ahlberg 2017) based on direct observations, start-up interviews and Mid-Term interviews. The final report at hand (2019) adds newly gathered project information to that overall picture, without unnecessary repeating of previously reported observations. The overall impression conveyed in this final report is in tune with that presented at the MEDEA Mid-term meeting in Aarhus University 2017.

## 3. Observations

### 3.1. Individual exit interviews

Fifteen ESR individuals signed up for exit interviews on development of research capacities and experienced value of MEDEA in the interval Dec 10<sup>th</sup> to Dec 20<sup>th</sup> 2018. Interviews were conducted via the MEDEA platform at BlueJeans.com and was sound recorded for later analysis. Interviews lasted for 15-25 minutes [2]. In the interviews the focus was on the experienced meaningfulness and usefulness in relation to the ESRs doctoral projects and careers. The support of the following individual key doctoral capabilities [cf. 3] was selected for inquiry:

- How to approach and develop a given research question;
- How to independently plan research;
- How to approach hands-on problems in research;
- How to write academically (disseminate MEDEA research outcomes).

Each interview ended with a question on the experienced added value of being an ESR in the MEDEA project.

#### 3.1.1. Comments on developed doctorate skills and research support

All interviewed ESRs started out with a given research task, a research question. A few followed their initially planned inquiry in detail whereas most had to iteratively revise and re-focus their task due to emerging research outcomes or laboratory constraints, which provided adequate ESR training in formulating meaningful researchable research questions. In one case the given research task had to be replaced in order to fit the timeline of the MEDEA project. The revisions of initially

given research tasks comes across as necessary iterations in non-trivial research that includes some risk of intermittent failures. One MEDEA ESR expressed it like this:

*–One should not be so rigid in the way you think, the problems we are dealing with are not solved. What I was used to before was problems for which you already knew the solution. The kind of problems I faced [in MEDEA] was different because you don't know. You have a question, try to solve it. It is then good not to be so conservative in the assumptions that you make. I really learned this.. let's just have ideas and we'll see if they work later. At first I wasn't shure if this was going to work, but at the end...*

The principal ESR support for solving each research task was strongly dominated by the main supervisors and other local scientists and staff in the home laboratories, sometimes with notable contributions by a secondment supervisor. However, 2<sup>nd</sup> and 3<sup>rd</sup> supervisor roles were mostly limited and some ESRs were not sure who formally acted as their external supervisors. In rare instances concrete support came from the peer ESRs in partner laboratories, particularly among ESRs whose work overlapped. For support of more hands-on research issues, local home-lab staff again played the main role, with an emphasis on informal support by local peers, postdocs, former collaborators and senior researchers. However, some key research outcomes were produced during secondments, given ample support by host ESRs and senior researchers, and additional knowledge was obtained from remote ESRs in some instances. The interviewed MEDEA ESRs appear to have planned their research with a considerable degree of professional mature autonomy, responsibility and initiative, paired with a willingness to share and ask for support within and without the MEDEA network. One ESR expressed:

*–As a MEDEA ESR you have to think that you're a researcher who needs to know what to do, to organize things on your own. It's not like your supervisor is your boss who assigns you some task that you finish. This is a very good environment for me to learn these things.*

The 3-year project time window is short, and the latest admitted ESRs who arrived late in the project have not yet had time to publish or report MEDEA research outcomes. However, several are now approaching and successfully passing their doctoral defences. Academic writing skills are key ESR competences, but the interviews reveal that most ESRs had little training in this, and that emerging MEDEA manuscripts and publications have not been actively incorporated in ESR activities. Instead of taking writing abilities for granted, early writing, training and manuscript seminars could be included if subsequent Marie Curie projects are planned. ESRs also suggest that proposal writing could be a useful ESR activity.

### 3.1.2. Experienced value of being a MEDEA Early Stage Researcher

As shown below (section 3.2.) the ESRs indeed appreciated being part of the MEDEA programme. This was confirmed in the individual interviews. Advantages include reliable funding of salary, equipment, conferences and travel, developed friendship and collegiality with peer ESRs and seniors, along with the enhanced formal status of having been a Marie Curie fellow. Before all the ESRs unanimously claim that MEDEA networking as the most valuable aspect. This included:

- Having informal contacts in case of a current research problems.
- Having an informal future informal network, including peer ESRs and seniors.
- Bringing partner lab ideas and solutions back to the home laboratory.
- Participating in joint MEDEA activities that provided academic and professional depth and breadth across disciplinary boundaries.

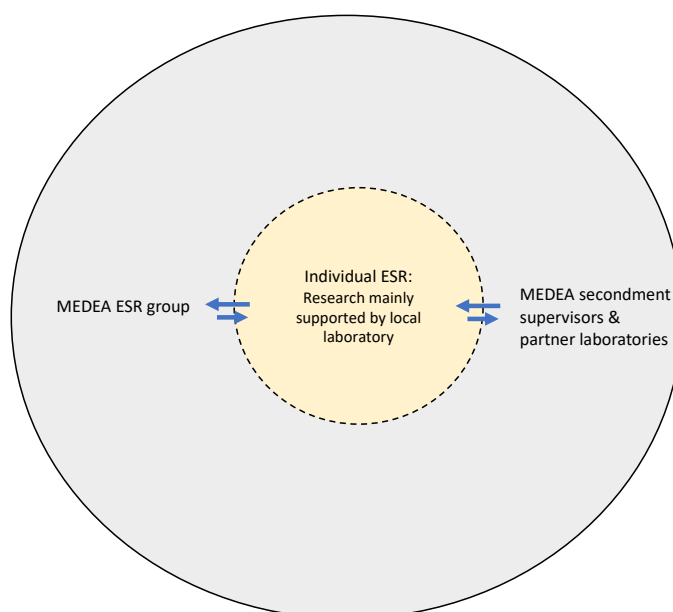
Interviewed ESRs said:

*–Preparing presentations (via BlueJean) helped me to improve my presentation skills, I got better at this over time. And some concrete trouble shooting; once I was in partner laboratory YY with fellow ESR NN, I had one tool and he had the other. We solved a problem we couldn't solve another way.*

*–The widening of horizons by having this network.. ..we were somehow connected, although we all did our own work. For some members their topics didn't really overlap, but for others.. ..this makes you understand better, grasp. There is also a connection in that there is a single target for all of us.*

*–Nice to have a peer network on related topics. And I also meet their supervisors, for instance during secondments. I can ask anyone anything on experimental details, which I did, instead of looking through ten papers. If I had such a question in the future I'd definitely use the network to solve it.*

The secondments clearly received the most varied assessments from the interviewed ESRs. For some, the most necessary research outcomes were derived at a MEDEA partner laboratory, outcomes that appeared necessary for their doctoral theses. For others MEDEA partner laboratories and ESR peers had little impact on their research tasks. So, whereas the individual research of some ESRs was clearly influenced from the larger MEDEA community, for others it was not (Fig. 1). For a future Marie Curie network, aspirations of more boundary crossings (blue arrows in Fig. 1) could be discussed. For this to happen, there needs to be a deeper involvement of the main and secondary supervisors around each ESR in the training programme.



*Fig. 1: Cross-over connections between individual ESRs research, partner laboratories and the MEDEA ESR cohort.*

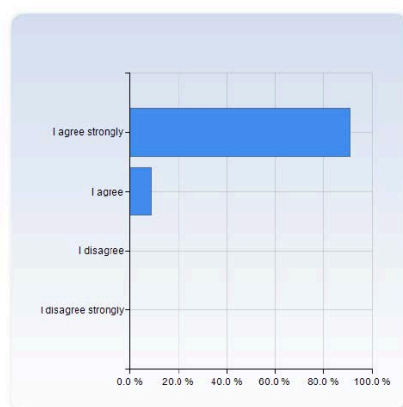
## 3.2. Web survey outcomes – individual ESR ratings

During the final MEDEA meeting at Lund University in September 2018 all seventeen MEDEA ESRs (100%) had a closed 1hr meeting after which they reported a range of pros, cons and suggestions to support any subsequent similar programme. The raised issues were then used as a basis for individual ESR ratings (3.2.1 - 3.2.6.), using the Lund University web survey tool SUNET Survey & Report (open Nov 23<sup>rd</sup> to Dec 3<sup>rd</sup>, 2018). Eleven ESRs decided to respond to the anonymous web survey:

### 3.2.1. Overall satisfaction

#### I would recommend others to join a programme such as MEDEA.

	Number of Responses
I agree strongly	10 (90.9%)
I agree	1 (9.1%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



#### Freetext comments – anything else?

- MEDEA is a really good network!
- The main issue is coming from the positioning ourselves. If we treat ourselves as an "ESR", then questions above are not the problems.
- However, in most of time, we still think ourselves as the other PhD "students". If this can be specified in the beginning of the program and all the PhD students can position themselves correctly, then this MEDEA program is close to perfect (In my point of view).
- No, there is not so much to add, in any case we can discuss during the interview
- I believe that we should not spend a whole MEDEA school (Nice) on management and how to make our scientific idea a start up, instead we could have a hand-on workshop during the first months.
- Keep the webinars online available.
- Journal clubs could involve our papers during the last months of the network
- In general, I am very happy on how everything was handled and organized in MEDEA. I don't think any part needs a radical revision, but rather some minor incremental improvements.
- What especially could be improved is the paperwork/administration part, especially when it comes to deadlines. There was a lot of redundancy in the documents and information we had to provide. For example the CDPs already contained all the information we were asked to provide frequently and could have been extracted by the management instead of asking us constantly. This devalued the CDPs considerably.
- My only concern is regarding the secondments. If they are planned a bit more thoughtfully and executed accordingly would have been more helpful.
- Reducing the frequency at which the updates for Carrier Development plan has to be done will be better. I would strongly recommend continuing the activity of academicians going to industries for the secondments.
- Was a great experience. I think having the opportunity to travel so much (secondments, schools, and grants for conferences) was excellent - although it did hammer home what I'll be missing out on when we leave the EU.. Thanks for the good times! James
- No

Fig. 2 (and free-text comments): MEDEA ESRs strongly endorse their programme.

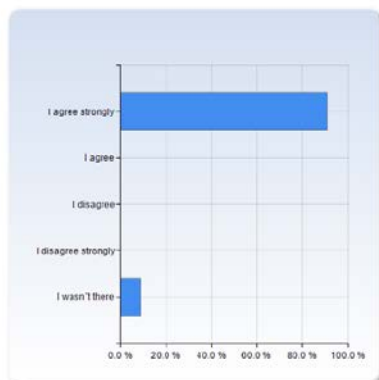


### 3.2.2. Summer and winter schools

**The Crete MEDEA school was composed of appreciated and useful activities.**

	Number of Responses
I agree strongly	10 (90.9%)
I agree	0 (0.0%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
I wasn't there	1 (9.1%)
Total	11 (100.0%)

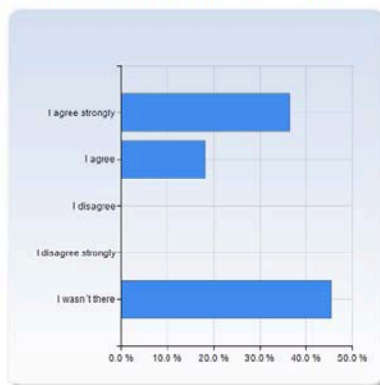
A: attosecond research state-of-the-art frontier



**The Milano MEDEA school was composed of appreciated and useful activities.**

	Number of Responses
I agree strongly	4 (36.4%)
I agree	2 (18.2%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
I wasn't there	5 (45.5%)
Total	11 (100.0%)

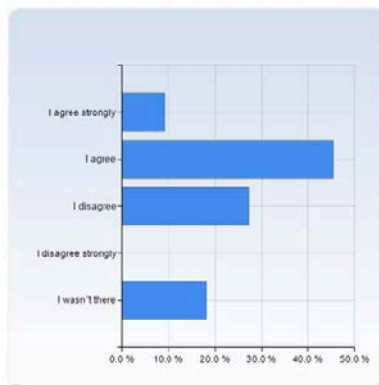
B: Outreach introduction



**The Nice MEDEA school was composed of appreciated and useful activities.**

	Number of Responses
I agree strongly	1 (9.1%)
I agree	5 (45.5%)
I disagree	3 (27.3%)
I disagree strongly	0 (0.0%)
I wasn't there	2 (18.2%)
Total	11 (100.0%)

C: Industrial application

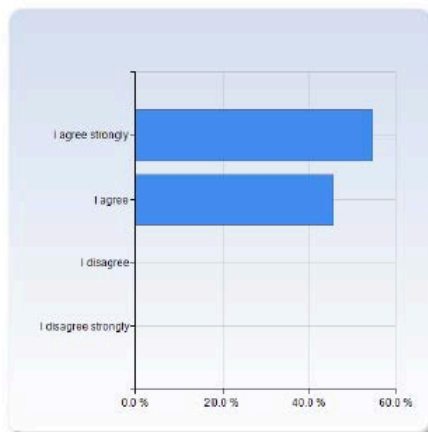


*Figs. 3 A-C: The summer/winter-school-meetings were differently appreciated among ESRs, which depended both on popularity of contents and presentation qualities. Note that some ESRs joined MEDEA late, in the middle part of the MEDEA period, which is why they couldn't participate in all three schools.*

### 3.2.3. Networking, journal clubs and webinars

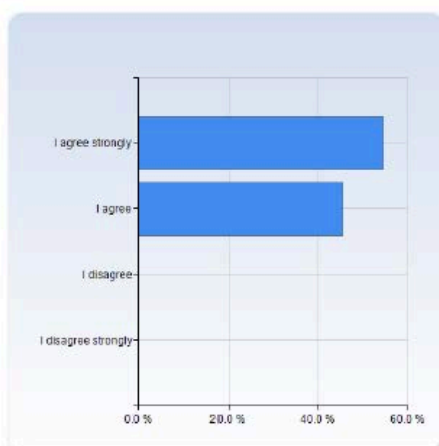
**MEDEA networking and scientific collaborations have been appreciated and adequate to me.**

	Number of Responses
I agree strongly	6 (54.5%)
I agree	5 (45.5%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



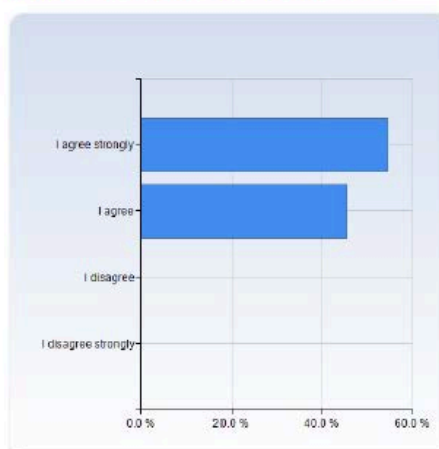
**Webinars are appreciated and useful activities of the MEDEA programme**

	Number of Responses
I agree strongly	6 (54.5%)
I agree	5 (45.5%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



**Journal clubs are appreciated and useful activities of the MEDEA programme**

	Number of Responses
I agree strongly	6 (54.5%)
I agree	5 (45.5%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



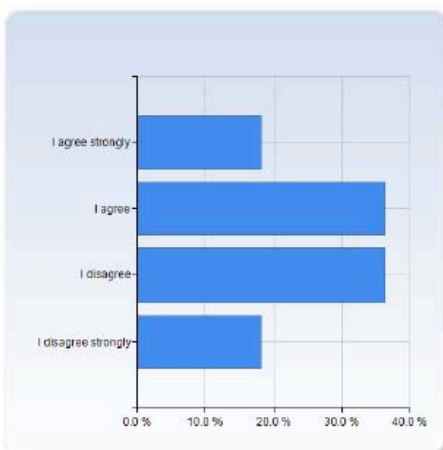
*Figs. 4 A-C: Networking & collaborations, webinars and journal clubs were highly appreciated among the ESRs.*



### 3.2.4. Secondments and outreach activities

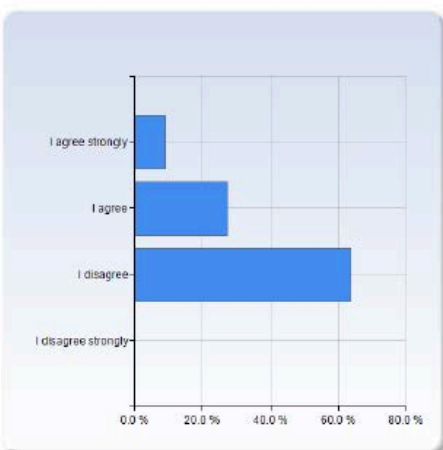
#### Secondments were too extensive.

	Number of Responses
I agree strongly	2 (18.2%)
I agree	4 (36.4%)
I disagree	4 (36.4%)
I disagree strongly	2 (18.2%)
Total	12 (100.1%)



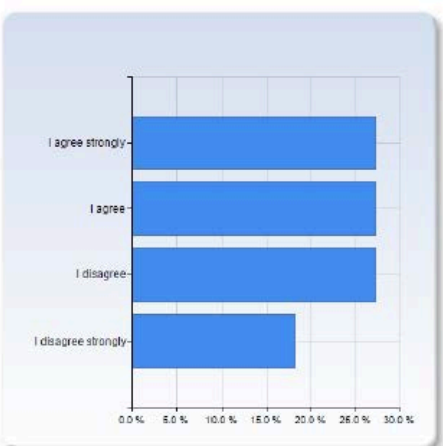
#### Secondments were not adequately planned in relation to my research task.

	Number of Responses
I agree strongly	1 (9.1%)
I agree	3 (27.3%)
I disagree	7 (63.6%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



#### Secondments in companies should not be compulsory.

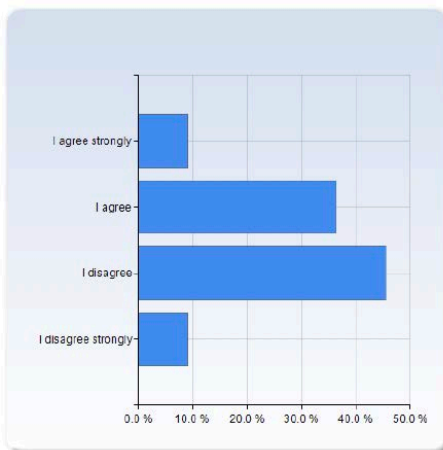
	Number of Responses
I agree strongly	3 (27.3%)
I agree	3 (27.3%)
I disagree	3 (27.3%)
I disagree strongly	2 (18.2%)
Total	11 (100.0%)



Figs. 5 A-C: There were mixed opinions of the secondments among the ESRs.

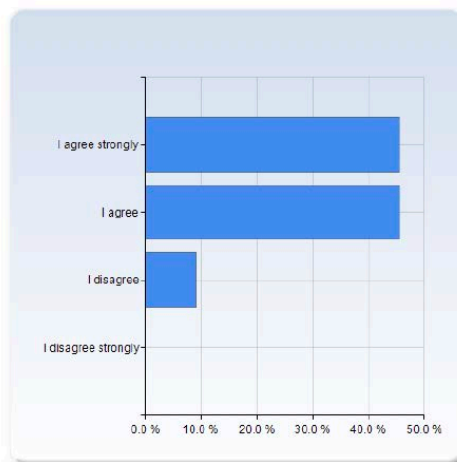
**The actual flexibility of secondment planning was unclear to me.**

	Number of Responses
I agree strongly	1 (9.1%)
I agree	4 (36.4%)
I disagree	5 (45.5%)
I disagree strongly	1 (9.1%)
Total	11 (100.0%)



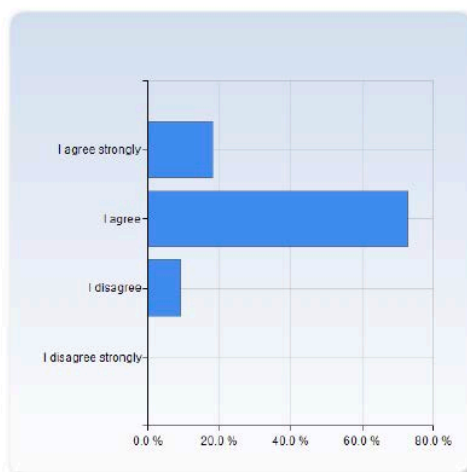
**Supervisors should be deeper involved in secondment planning.**

	Number of Responses
I agree strongly	5 (45.5%)
I agree	5 (45.5%)
I disagree	1 (9.1%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



**ESRs should not have to administrate their outreach activities (should be handled by seniors).**

	Number of Responses
I agree strongly	2 (18.2%)
I agree	8 (72.7%)
I disagree	1 (9.1%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)

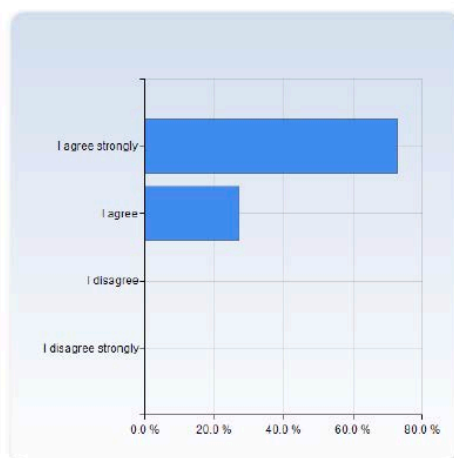


*Figs. 5: E-F: Most ESRs suggest a deeper involvement of supervisors in the planning of secondment visits and the arrangements of their outreach activities.*

### 3.2.5. Resources, administration, rights

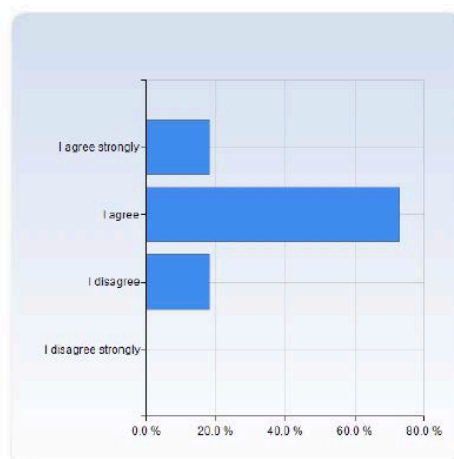
#### MEDEA project funding has been appreciated and adequate.

	Number of Responses
I agree strongly	8 (72.7%)
I agree	3 (27.3%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



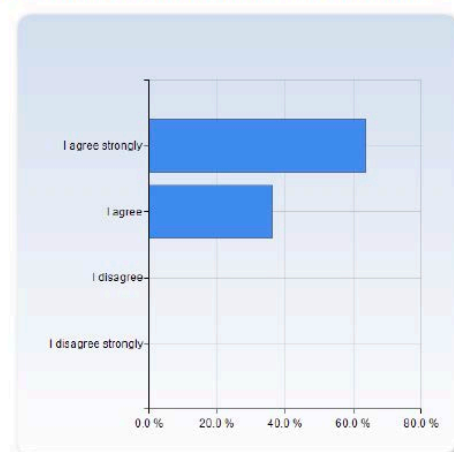
#### The MEDEA career development plans were not really used or useful.

	Number of Responses
I agree strongly	2 (18.2%)
I agree	8 (72.7%)
I disagree	2 (18.2%)
I disagree strongly	0 (0.0%)
Total	12 (109.1%)



#### ESRs rights as project members in MEDEA has been appreciated and adequate.

	Number of Responses
I agree strongly	7 (63.6%)
I agree	4 (36.4%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)

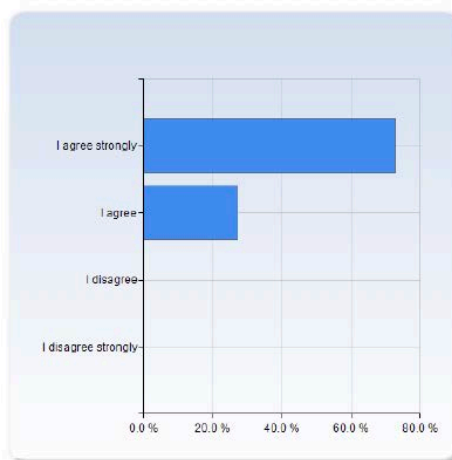


Figs. 6 A-C: MEDEA ESRs feel well-resourced and taken care of, although administrative procedures such as the updating of the Career Development Plans came across as ineffective. Sometimes administrative instructions were sent out at a too short notice.

### 3.2.6. Suggested added activities

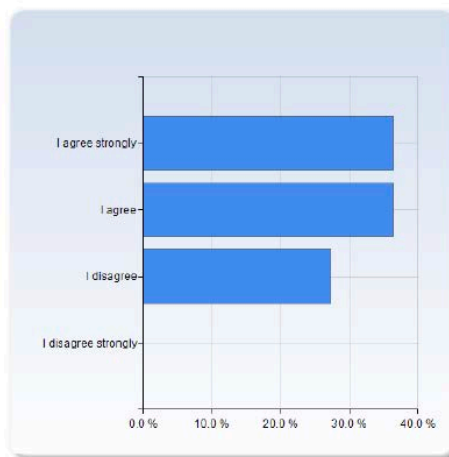
#### ESR training in proposal-writing would have been useful.

	Number of Responses
I agree strongly	8 (72.7%)
I agree	3 (27.3%)
I disagree	0 (0.0%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



#### More info on how to stay in academia would have been useful.

	Number of Responses
I agree strongly	4 (36.4%)
I agree	4 (36.4%)
I disagree	3 (27.3%)
I disagree strongly	0 (0.0%)
Total	11 (100.0%)



Figs. 7: A-B: ESRs suggest additional activities, for future similar projects.

#### 4. Conclusion

The interviews and survey of this final assessment clearly indicate that MEDEA has been a very appreciated and successful training programme for the participating ESRs. Minor problems have been identified, mainly around secondments and outreach activities. For future Marie Curie Programs, some adjustments may be considered:

- Increased ESR group and partner lab involvement in individual ESRs research
- Increased training in key doctoral skills (academic writing, research ethics, etc)
- Increased supervisor involvement in collective ESR training activities

#### 5. Acknowledgments

This research school assessment was conducted within, and fully financed by, the Horizon 2020 Research and Innovation Programme; Marie Skłodowska-Curie grant agreement No. 641789. The interviewed doctoral candidates are duly thanked for sharing their experiences of the MEDEA programme.

#### 6. References

[1] <http://www.medeia-horizon2020.eu/>

[2] Kvale & Brinkman. 2008. Interviews, 2nd Edition. Thousand Oaks: SAGE. ISBN 978-0-7619-2542-2

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