

Career Development Plan - Year 1

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Name of Supervisor: Nigel Glover

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BRIEF OVERVIEW OF RESEARCH PROJECT AND MAJOR ACCOMPLISHMENTS EXPECTED (half page should be sufficient)

At this point the project is focused on the acquisition of new techniques for the computation of QCD processes up to NNLO by means of the Antenna Subtraction Method. The antennae allow us to extract and remove divergences present in the various observables we can study when performing experimental analysis.

In the first months, the aim is to derive the NNLO subtraction terms for simple processes using the existing antenna. Once the complexity of the subtraction term is understood, the next step will be to create new, more efficient, antennae which will directly map out the unresolved singularities of the matrix elements. This will lead to efficiency gains both in deriving the subtraction terms themselves and in the subsequent numerical implementation. If all goes according to plan, this part of the project would lead to a first publication.

LONG –TERM CAREER OBJECTIVES (over 5 years):

1. *Goals:*

- ✓ successful completion of thesis and defence in 2018 leading to award of PhD
- ✓ original research leading to publications in high impact peer reviewed journals
- ✓ presentation of research at conferences/workshops in the field to gain exposure to the community
- ✓ first Post-Doctoral research position

2. *What further research activity or other training is needed to attain these goals?*

- ✓ Presentation skills.
- ✓ Networking and communication skills.
- ✓ Training in writing research papers.
- ✓ Training in writing applications for scientific positions/research grants.
- ✓ Secondment to Zurich to benefit from research experience of co-workers based there.
- ✓ Secondment to Private Sector Partner to learn about research in a commercial environment.
- ✓ Learning how to effectively communicate with scientists who are using different methods to explore the same physics – specifically experimental particle physicists.

SHORT-TERM OBJECTIVES (1-2 years):

1. *Research results:*

- *Anticipated publications:*
 - ✓ Completion of initial project on antenna subtraction for Higgs processes
 - ✓ Further application to precise predictions for Higgs processes
- *Anticipated conference, workshop attendance, courses, and/or seminar presentations:*
 - ✓ Attending all HiggsTools meetings – Young Researcher meetings, Annual Meetings, Annual Schools, etc
 - ✓ Attending major conferences in related areas for example “Loops and Legs” conference in 2016, “Radiative Corrections” workshop in 2017 as well as meetings related to Higgs, such as “Higgs Couplings” 2016.
 - ✓ Presentation of work at HiggsTools Annual Meetings and Young Researcher Meetings. Giving Seminars within Durham and at other nodes of the network.

2. *Research Skills and techniques:*

- *Training in specific new areas, or technical expertise etc.:*
 - ✓ Further training in mathematical and computational methods.
 - ✓ Further training in theoretical physics and the application of theory to experiment.

3. *Research management:*

- *Fellowship or other funding applications planned (indicate name of award if known; include fellowships with entire funding periods, grants written/applied for/received, professional society presentation awards or travel awards, etc.)*
 - ✓ Aim is to make application for EU Marie Skłodowska-Curie Fellowship in 2018.

4. *Communication skills:*

see above

5. *Other professional training (course work, teaching activity)*

- ✓ Possibly training in teaching and assessing undergraduate students (might be useful if I would like a longer term career in academia, and would also improve presentation skills).

6. *Anticipated networking opportunities*

- ✓ Looking forward to networking with the other ESRs within the network and building up support structures that will help my research activity.

7. *Other activities (community, etc.) with professional relevance:*

- ✓ Training in how to communicate science effectively to young people so I can share my excitement of particle physics and inspire them to study science.

Date & Signature of ESR:

Date Signature of Supervisor: