

Learning Agreement

Student Mobility for Traineeships

Trainee	Last name(s)	First name(s)	Date of birth	Nationality¹	Sex [M/F]	Study cycle²	Field of education³
	Balogh	Gábor Dániel	05.01.1994	Hungarian	M	Master	0710
Sending Institution	Name	Faculty/ Department	Erasmus code⁴ (if applicable)	Address	Country	Contact person name⁵; email; phone	
	Pázmány Péter Catholic University	Information Technology and Bionics	HU BUDAPEST12	1083 Budapest Práter utca 50/a	Hungary	Henrietta Novák novak.henrietta@itk.ppke.hu +361 8864706	
Receiving Organisation/Enterprise	Name	Department	Address; website	Country	Size	Contact person⁶ name; position; e-mail; phone	Mentor⁷ name; position; e-mail; phone
	University of Warwick	Department of Computer Science	Coventry. CV4 7AL; https://www2.warwick.ac.uk/	United Kingdom	☐ < 250 employees ☒ > 250 employees	Dr. Victor Sanchez v.f.sanchez-silva@warwick.ac.uk	Dr. Gihan R. Mudalige Assistant Professor g.mudalige@warwick.ac.uk +44 (0)2476523195

Before the mobility

Table A - Traineeship Programme at the Receiving Organisation/Enterprise

Planned period of the mobility: from 09/17 to 01/18

Traineeship title: Mapping parallel applications to heterogeneous hardware architectures

Number of working hours per week: 40

Detailed programme of the traineeship: The traineeship will focus on understanding high-level domain-specific libraries and algorithmic descriptions, and how to map them to heterogeneous hardware architectures, with a particular focus on many-core hardware, such as GPUs and server-grade CPUs. As part of this, the student will learn about performance modelling techniques, and work towards a heterogeneous scheduling of the high-level algorithms onto multiple computational hardware architectures.

Knowledge, skills and competences to be acquired by the end of the traineeship (expected Learning Outcomes): An understanding of key performance modelling techniques, practical experience with programming CPUs and GPUs, knowledge of mapping techniques from high-level algorithmic descriptions to various hardware architectures.

Monitoring plan: There will be weekly meetings between the supervisor and the student to discuss progress so far and determine next steps to be taken.

Evaluation plan: Work done will be evaluated on a monthly basis, with both supervisors. At the end of the mobility, a summarising presentation will be given to the receiving institution at Warwick, and upon return at PPCU.

The level of **language competence⁸** in English [indicate here the main language of work] that the trainee already has or agrees to acquire by the start of the mobility period is: A1 ☐ A2 ☐ B1 ☐ B2 ☒ C1 ☐ C2 ☐ Native speaker ☐

Table B - Sending Institution

Please use only one of the following three boxes: ⁹

1. The traineeship is **embedded in the curriculum** and upon satisfactory completion of the traineeship, the institution undertakes to:

Award ECTS credits (or equivalent) ¹⁰	Give a grade based on: Traineeship certificate ☐ Final report ☐ Interview ☐
Record the traineeship in the trainee's Transcript of Records and Diploma Supplement (or equivalent).	
Record the traineeship in the trainee's Europass Mobility Document: Yes ☐ No ☐	

2. The traineeship is **voluntary** and, upon satisfactory completion of the traineeship, the institution undertakes to:

Award ECTS credits (or equivalent): Yes ☐ No ☒	If yes, please indicate the number of credits:
Give a grade: Yes ☐ No ☒	If yes, please indicate if this will be based on: Traineeship certificate ☐ Final report ☐ Interview ☐
Record the traineeship in the trainee's Transcript of Records: Yes ☐ No ☒	
Record the traineeship in the trainee's Diploma Supplement (or equivalent).	
Record the traineeship in the trainee's Europass Mobility Document: Yes ☒ No ☐	

3. The traineeship is carried out by a **recent graduate** and, upon satisfactory completion of the traineeship, the institution undertakes to:

Award ECTS credits (or equivalent): Yes ☐ No ☐	If yes, please indicate the number of credits:
Record the traineeship in the trainee's Europass Mobility Document (<i>highly recommended</i>): Yes ☐ No ☐	

Accident insurance for the trainee

The Sending Institution will provide an accident insurance to the trainee (if not provided by the Receiving Organisation/Enterprise): Yes ☐ No ☐	The accident insurance covers: - accidents during travels made for work purposes: Yes ☐ No ☐ - accidents on the way to work and back from work: Yes ☐ No ☐
The Sending Institution will provide a liability insurance to the trainee (if not provided by the Receiving Organisation/Enterprise): Yes ☐ No ☐	

Table C - Receiving Organisation/Enterprise

The Receiving Organisation/Enterprise will provide financial support to the trainee for the traineeship: Yes ☐ No ☒	If yes, amount (EUR/month):
The Receiving Organisation/Enterprise will provide a contribution in kind to the trainee for the traineeship: Yes ☐ No ☒ If yes, please specify:	
The Receiving Organisation/Enterprise will provide an accident insurance to the trainee (if not provided by the Sending Institution): Yes ☐ No ☒	The accident insurance covers: - accidents during travels made for work purposes: Yes ☐ No ☒ - accidents on the way to work and back from work: Yes ☐ No ☒
The Receiving Organisation/Enterprise will provide a liability insurance to the trainee (if not provided by the Sending Institution): Yes ☐ No ☒	
The Receiving Organisation/Enterprise will provide appropriate support and equipment to the trainee.	
Upon completion of the traineeship, the Organisation/Enterprise undertakes to issue a Traineeship Certificate within 5 weeks after the end of the traineeship.	

By signing this document, the trainee, the Sending Institution and the Receiving Organisation/Enterprise confirm that they approve the Learning Agreement and that they will comply with all the arrangements agreed by all parties. The trainee and Receiving Organisation/Enterprise will communicate to the Sending Institution any problem or changes regarding the traineeship period. The Sending Institution and the trainee should also commit to what is set out in the Erasmus+ grant agreement. The institution undertakes to respect all the principles of the Erasmus Charter for Higher Education relating to traineeships (or the principles agreed in the partnership agreement for institutions located in Partner Countries).

Commitment	Name	Email	Position	Date	Signature
Trainee	Gábor Dániel Balogh	balogh.gabor.daniel@hallgato.ppke.hu	Trainee		
Responsible person ¹¹ at the Sending Institution	István Reguly	reguly.istvan@itk.ppke.hu	Assistant Professor		
Supervisor ¹² at the Receiving Organisation	Gihan R Mudalige	g.mudalige@warwick.ac.uk	Assistant Professor		

During the Mobility

Table A2 - Exceptional Changes to the Traineeship Programme at the Receiving Organisation/Enterprise (to be approved by e-mail or signature by the student, the responsible person in the Sending Institution and the responsible person in the Receiving Organisation/Enterprise)	
Planned period of the mobility: from [month/year] till [month/year]	
Traineeship title: ...	Number of working hours per week: ...
Detailed programme of the traineeship period:	
Knowledge, skills and competences to be acquired by the end of the traineeship (expected Learning Outcomes):	
Monitoring plan:	
Evaluation plan:	

After the Mobility

Table D - Traineeship Certificate by the Receiving Organisation/Enterprise
Name of the trainee: Gábor Dániel Balogh
Name of the Receiving Organisation/Enterprise: University of Warwick, Department of Computer Science
Sector of the Receiving Organisation/Enterprise:
Address of the Receiving Organisation/Enterprise [street, city, country, phone, e-mail address], website: CV4 7AL Coventry, United Kingdom, https://www2.warwick.ac.uk
Start date and end date of traineeship: from [day/month/year] 01/09/2017 to [day/month/year] 26/01/2018
Traineeship title: Mapping parallel applications to heterogeneous hardware architectures
Detailed programme of the traineeship period including tasks carried out by the trainee: The traineeship focused on understanding high-level domain-specific libraries and algorithmic descriptions, and how to map them to heterogeneous hardware architectures with particular focus on many-core hardware, such as GPUs and server-grade CPUs. As part of this, the student learnt about performance modelling techniques, and worked towards a heterogeneous scheduling of the high-level algorithms onto multiple computational hardware architectures.
Knowledge, skills (intellectual and practical) and competences acquired (achieved Learning Outcomes): The student developed a standalone tool that can automatically parallelise existing unstructured mesh codes using clang libTooling. Through this, he got to practice and gain important software engineering skills necessary for an efficient design, implementation and testing of applications. He also learnt how modern compilers work and how to use them for the transformation of source codes. He also gained knowledge about low level optimisations on modern CPUs like vectorisation. By interacting

every day with English members of the research group, his language skills and academic vocabulary also improved.

Evaluation of the trainee:

The traineeship was very successful and was instrumental for carrying out a number of important research tasks in my area of work. Mr. Balogh was a very talented and hardworking trainee who, during this traineeship produced work that was published in a top ranking High Performance Computing Workshop. A further publication in a high-ranking journal will also be achieved with the work done during this traineeship. I continue to work with him after his return to his home university. The links he had established while here at Warwick will be very useful to his future career and for our collaboration.

Date:

Name and signature of the Supervisor at the Receiving Organisation/Enterprise:



Dr. Gihan R. Mudalige
Assistant Professor,
Department of Computer Science,
University of Warwick. CV4 7AL
UK

-
- ¹ **Nationality:** Country to which the person belongs administratively and that issues the ID card and/or passport.
- ² **Study cycle:** Short cycle (EQF level 5) / Bachelor or equivalent first cycle (EQF level 6) / Master or equivalent second cycle (EQF level 7) / Doctorate or equivalent third cycle (EQF level 8).
- ³ **Field of education:** The [ISCED-F 2013 search tool](http://ec.europa.eu/education/tools/isced-f_en.htm) available at http://ec.europa.eu/education/tools/isced-f_en.htm should be used to find the ISCED 2013 detailed field of education and training that is closest to the subject of the degree to be awarded to the trainee by the sending institution.
- ⁴ **Erasmus code:** a unique identifier that every higher education institution that has been awarded with the Erasmus Charter for Higher Education (ECHE) receives. It is only applicable to higher education institutions located in Programme Countries.
- ⁵ **Contact person at the sending institution:** a person who provides a link for administrative information and who, depending on the structure of the higher education institution, may be the departmental coordinator or will work at the international relations office or equivalent body within the institution.
- ⁶ **Contact person at the Receiving Organisation:** a person who can provide administrative information within the framework of Erasmus+ traineeships.
- ⁷ **Mentor:** the role of the mentor is to provide support, encouragement and information to the trainee on the life and experience relative to the enterprise (culture of the enterprise, informal codes and conducts, etc.). Normally, the mentor should be a different person than the supervisor.
- ⁸ **Level of language competence:** a description of the European Language Levels (CEFR) is available at: <https://europass.cedefop.europa.eu/en/resources/european-language-levels-cefr>
- ⁹ **There are three different provisions for traineeships:**
1. Traineeships embedded in the curriculum (counting towards the degree);
 2. Voluntary traineeships (not obligatory for the degree);
 3. Traineeships for recent graduates.
- ¹⁰ **ECTS credits or equivalent:** in countries where the "ECTS" system it is not in place, in particular for institutions located in Partner Countries not participating in the Bologna process, "ECTS" needs to be replaced in all tables by the name of the equivalent system that is used and a web link to an explanation to the system should be added.
- ¹¹ **Responsible person at the sending institution:** this person is responsible for signing the Learning Agreement, amending it if needed and recognising the credits and associated learning outcomes on behalf of the responsible academic

body as set out in the Learning Agreement. The name and email of the Responsible person must be filled in only in case it differs from that of the Contact person mentioned at the top of the document.

¹² **Supervisor at the Receiving Organisation:** this person is responsible for signing the Learning Agreement, amending it if needed, supervising the trainee during the traineeship and signing the Traineeship Certificate. The name and email of the Supervisor must be filled in only in case it differs from that of the Contact person mentioned at the top of the document.