

# SPIN-NANO

## PROPOSED REVISED SECONDMENT PLAN (for approval by European Project Officer)

Updated by Sally Greenough - 25/06/2018

ESR	Beneficiary	Preliminary programme of secondments (place)	New secondment (place)	Start Date	End Date	Duration (months)	Time (Project Month)	Goals	Letter of Commitment received from external host	
1	Alessandro Catanzaro	USFD	CNRS, ETH, UMAN-NGI, HQG	HPL	16/04/18	11/05/18	1.00	27	Work on top level thin film deposition equipment in order to encapsulate 2D material into conventional semiconductor devices. Training on the characterisation of thin film deposited. ESR1 & ESR11 to undertake secondment at the same time.	
				ETH	15/09/18	31/10/18	1.50	33	Work with state of the art fabrication techniques to create highly tailored VdW Heterostructures. Training with grove box fabrication and EBL.	
						2.50				
2	Luca Sortino	USFD	HPL, ATT, JPE, UNIBAS, UCAM	UNIBAS	08/10/18	07/12/18	2.00	34-36	Learn tunable microcavity experiments; work with NV centres in diamond embedded in high Q microcavities.	
				External - TU Dortmund	20/06/18	30/06/18	0.30		carry out time resolved spectroscopy with a higher timing resolution than what is possible here in Sheffield. Luca has built and used a time correlated single photon counting setup, with resolution down to 90 picoseconds, to study the dynamics of a novel photonic structure comprising a 2D semiconductor and a dielectric nanocavity.	uploaded June 2018
						2.30				
3	Alejandro Rodriguez	UCAM	TUD, UKON, USFD, ATT, JPE, E6	UKON	03/09/18	21/09/18	0.50	33	To gain a deeper theoretical understanding of 2d materials, as well as their simulation, to test possible models for the arising of QDs in 2d materials.	
				External - University of Harvard	24/09/18	17/11/18	2.00	34-35	Study the optomechanics of single-photon emitters in TMDs.	uploaded April 2018
						2.50				
4	Najwa Sidqi	HPL	USFD, TUD, UNIBAS, ATT, JPE	USFD	20/03/17	24/03/17	0.25	15	Optical imaging of TMDs photoluminescence using a Bright field microscope, fabrication and transfer of TMD monolayers, Raman spectroscopy and Room temperature PL of TMD monolayers	
				USFD	03/07/17	07/07/17	0.25	19	Low temperature photoluminescence measurement of TMD monolayers, measurement of electrical breakdown of single layer dielectric coatings using a 4 points probing station	
				USFD	27/11/17	05/12/17	0.25	23	PL imaging using bright field microscope of TMD encapsulated structures. Room and low temperature PL measurement of TMD monolayers encapsulated at Helia Photonics. Exfoliation of TMD materials and flake search using a bright field Microscope. Discussion of next research steps for encapsulation trials to be performed at helia Photonics.	
				UNIBAS	03/04/18	13/04/18	0.50	28	Working with ESR11 on fabrication of curved mirrors using CO2 laser ablation	
				UNIBAS	14/05/18	25/05/18	0.50	29	Working with ESR11 to perform cavity experiments and Q factor measurements using Helia Mirrors	
				External - University of the West of Scotland	01/08/18	15/08/18	0.50	32	Explore quantum cavity mirror technologies not available at Helia - in support of WP4 & MS2. ESR to learn skills in either 2 bubbler MOCVD or Microwave Assisted Sputtering. Secondment maybe extended.	uploaded April 2018
				tbc	01/07/18	31/08/18	2.00	31-32	To work on alternative deposition technologies Helia can't offer	
				USFD	15/10/18	21/10/18	0.25	34	PL imaging and measurements of TMD encapsulated structures at Helia Photonics, working with ESR1	
				USFD	10/12/18	15/12/18	0.25	36	Measurement of monotithic microcavities with ESR1	
				TUD	14/01/19	18/01/19	0.50	37	Working with ESR13 on Nitrogen vacancies experiments	
						5.25				
5	Andrii Volkovskiy	TUM	ATT, TUD, UNIBAS, E6	USFD	26/11/18	21/12/18	1.00	36	Study of time-resolved spectroscopy technique	
				ATT	01/07/19	26/07/19	1.00	43	Nanofabrication processes in industry	
				UNIBAS	02/09/19	27/09/19	1.00	45	Study of exfoliation technique for 2D materials	
						3.00				
6	Matthew Brooks	UKON	USFD, ETH, UNIBAS, HQG	USFD	12/03/18	06/04/18	1.00	26	Apply already developed theoretical TMD strain confinement model to make predictions on the experimental systems of ESR 2 (dates to be finalised)	
				ETH	01/08/18	31/08/18	1.00	32	Investigate the differences between the experiments of ESR. 9 and theory prections of MoS2 QDs (Dates to be finalised)	
						2.00				

7	<b>Samarth Vadia</b>	ATT	TUM, UNIBAS, USFD, HPL	External - LMU	29/01/18	27/04/18	3.00	26 - 28	Secondment with the group of Prof. Högele at the Ludwig Maximilians University. Experiments on polariton condensation in carbon nano tubes at cryogenic temperature. The goal of the secondment is to expose the ESR to a scientific research team work and for him to experiment in creating strong coupling between photon and elementary excitonic excitations in solid with the use of Fabry-Perot cavities. The ESR will have a chance also to co-author one or more scientific publications on this topic.	uploaded April 2018
							3.00			
8	<b>Marco Manca</b>	CNRS	USFD, UMAN-NGI, ETH, HQG	ETH	30/10/17	10/11/17	0.50	22	The work at ETH consisted of building an optical setup with the purpose of studying the formation of exciton-polariton in an optical microcavity where the active mean is represented by a TMD monolayer. In particular the idea was to create a optical system in which, by adding or removing a lens it would have been possible to swich between real space imaging to k-space one. Building an optical setup improved ESR's experimental skills. He gained confidence with the wet-cryogenic technique and with the physics beyond polariton quasi-particle. Discussions with the members of the group were extremely valuable.	
				External - Arizona State University and Cactus Inc	Sep-18	Oct-18	0.75	33	Processing novel materials for 2D optoelectronics in group of Sefaatin Tongay at Arizona State University, in collaboration with industrial partner of the Tongay group : Cactus Inc. The group at ASU is working on materials grown by LPVT and CVD, a very promising alternative to the exfoliated samples mainly used by ITN SpinNano. This additional material will allow ESR8 to be trained on sample characterization so far not available within the network.	uploaded May 2018
				External - Ioffe Institute, St. Petersburg	Nov-18	Feb-19	0.75	35	Theoretical Modelling of optical properties of 2D semiconductors. Marco has already successfully published results with the group of Mikhail Glazov at the Ioffe Institute, and input from such an experienced group will valuable additional training towards the end of Marco's thesis, which will involve interpreting the experimental data collected by Marco in Toulouse.	uploaded April 2018
							2.00			
9	<b>Riccardo Pisoni</b>	ETH	TUD, UMAN-NGI, HQG, TUD, Lcryo	External IBM - Zurich	01/06/18	31/08/18	3.00	30-33	Development ad applications of artificial intelligent methodologies (machine learning, neural network, etc) to problems relevant for industrial use cases (materials development such as metallic allows or coatings, process optimisaton for manufacturing).	uploaded April 2018
							3.00			
10	<b>Aroosa Ijaz</b>	ETH	UMAN-NGI, HQG, USFD, CNRS				0.00			
							0.00			
11	<b>Sigurd Flagan</b>	UNIBAS	HPL, ATT, JPE, USFD, TUD	HPL	16/04/18	04/05/18	0.75	28	ESR1 & ESR11 to undertake secondment at the same time. Learn about the dielectric deposition processes and equipment. Produce high quality thin dielectric films.	
				ATT	04/06/18	15/06/18	0.50	30	Work on improving the high stability cryogenic set-ups	
				USFD	03/09/18	28/09/18	1.00	33	Work on single photon emitters in layered materials	
							2.25			
12	<b>Yanick Volpez</b>	UNIBAS	UCPH, TUD, ETH, UKON, URENCO	External - University of Minnesota	02/05/18	23/05/18	0.75	29	The total length of the secondment will be 2 months. Having obtained our results on the fractional TI phase in a Rashba multilayer heterostructure using energy and symmetry arguments combined with bosonization technique, ESR12 plans to reconsider the same system and tackle the interacting problem with a more conventional approach using diagrammatic perturbation theory. Prof. Chubukov is an outstanding expert in the field of strongly correlated electrons. ESR12 will learn new theoretical tools, which complement his present skills and from which he can profit in his future career in theoretical physics.	uploaded April 2018
				External - University of Minnesota	01/07/18	01/08/18	1.25		The second part of the secondment will take place in either July or September 2018 depending on how the project evolves.	
							2.00			
13	<b>Matteo Pompili</b>	TUD	UCAM, UNIBAS, ATT, JPE, E6	UCAM	01/02/19	15/02/19	0.50	38	Learn about different color centers; transfer NV center network knowledge	
				UNIBAS	01/07/19	15/07/19	0.50	43	Learn about different cavities; transfer NV center network knowledge	
				External - University of Innsbruck	01/11/19	15/11/19	0.50	47	Learn about ion-trap based quantum networks	uploaded May 2018
							1.50			
14	<b>Stephan Philips</b>	TUD	UCPH, ETH, UNIBAS, URENCO, LCRYO	UCPH	27/08/18	07/09/18	0.50	33	Programming of gatemon circuits	
				External - Intel's quantum Group (Oregon, USA)	01/06/19	01/09/19	3.00	42-44	Operation of spin qubit devices in an industrial setting (Summer 2019 tbc) (approximate dates)	?

					3.50				
15	Fabio Ansaloni UCPH	TUD, UNIBAS, URENCO, LCRYO	External - University of Grenoble Alpes	28/05/18	15/06/18	0.75	29-30	Characterization of industrial-grade (LETI) spin qubit devices. We will try to follow this secondment up by further visits, to include training on coherent control of spin qubits by EDSR, and simulation techniques for layouts of gate electrodes (see UCPH specific comment on PhD duration in Denmark below).	uploaded April 2018
			TUD	09/09/18	22/09/18	0.50	33	Investigation of spin qubits properties in SiGe systems. More specifically, this will include programming of silicon qubit operations and/or microwave-coupling of silicon spin qubits. If possible, this secondment will be split into two (see UCPH specific comment on PhD duration in Denmark below).	
			External - Microsoft Station Q (Copenhagen and Sydney), and comment on reduction of formal secondment of ESR15	2019	2019	0.50	48	Change of academic environment, exposure to industrial quantum technology development (in particular topological qubit circuits developed by Microsoft Research Station Q), networking with spin qubit community in Australia. These non-finalized activities for ESR15 are designed to expose Fabio Ansaloni to various research environments, including industrial environments (here Microsoft, above see CEA-LETI). Im designing all secondments listed above for Fabio, care is taken by the PI to achieve the underlying goals of spin-nano, including that "the new skills acquired by an individual ESR maximize the research output from his/her project". This is not simply done by a 3-month secondment, which would place Fabio into an unfair situation to continue his (international) career after completion of his PhD in Denmark. As the PhD program at UCPH is only 3 years long, requires significant teaching duties and outreach from every PhD student, it is challenging to achieve an overall PhD training that is competitive with international PhDs from, for example, the US. The PI of Fabio has applied for a collaboration award to bring together the qubit communities of UCPH and the University of Sydney (outcome pending), which will include travel money for PhD student exchange.	?
					1.75				