Chiral-Induced Spin Selectivity Effect

Funded by the European Union

CISSE
RECRUITMENT LEAFLET

UPDATE: The new deadline for application is **May 30, 2023** (see pages 16-17)

How do MSCA-DNs work?[1]

The Marie Skłodowska-Curie Actions (MSCA) fund excellent research and innovation and equip researchers at all stages of their career with new knowledge and skills, through mobility across borders and exposure to different sectors and disciplines.

CISSE (Chiral-Induced Spin Selectivity Effect) is a MSCA Doctoral Network (DN) which seeks to implement doctoral programmes by partnerships of organisations from different sectors across Europe and beyond to train highly skilled doctoral candidates, stimulate their creativity, enhance their innovation capacities and boost their employability in the long-term.

Glossary

Term	Definition
Action	Under Horizon Europe, "action" refers to the specific project to be implemented by the beneficiaries and the associated partners.
Associated Partners	are entities which participate in the action, but without the right to charge costs or claim contributions. They contribute to the implementation of the action, but do not sign the grant agreement. Associated partners may not employ the researchers under the action.
Beneficiaries	are the legal entities that sign the grant agreement and have the responsibility for the proper implementation of the action. They contribute directly to the implementation of the research, transfer of knowledge and training activities. Every beneficiary of a MSCA-DN must recruit, host at their premises and supervise at least 1 Doctoral Candidate.
Doctoral Candidates (DCs)	All researchers recruited in a Doctoral Network (DN) must be Doctoral Candidates (i.e. not already in possession of a doctoral degree at the date of the recruitment) and undertake transnational mobility (see the mobility rule definition below). The recruited researchers must comply with the eligibility criteria described at the end of this document (Recruitment process).
Date of Recruitment	means the first day of the employment of the researcher for the purposes of the action (i.e. the starting date indicated in the employment contract or equivalent direct contract).
Mobility Rule	Researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before their date of recruitment. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention are not taken into account. For international European research organisations,

[1] Source: https://marie-sklodowska-curie-actions.ec.europa.eu/

Term	Definition
	international organisations, or entities created under Union law, recruited researchers must not have spent more than 12 months in the 36 months immediately before their date of recruitment in the same appointing organisation. Note that the mobility rule applies to the (first) beneficiary where the researcher is recruited. In case of multiple recruitments, the mobility rule only applies to the first recruitment.
Coordinator	The beneficiary which is the central contact point for the Research Executive Agency (REA) and represents the consortium towards REA. In CISSE, the Coordinator is Université Libre de Bruxelles.
Secondment	is a research training period spent by a fellow at the premises of a different beneficiary, an associated partner included in the list of participants. The premises of the beneficiaries / associated partners must be independent from each other and therefore the secondment must involve physical mobility of the fellow. During their secondment, researchers receive supervision and training at the premises of the receiving beneficiary or associated partner.
European Charter and Code for Researchers	Commission Recommendation of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers, C(2005)576 of 11March 2005.

The CISSE team

The CISSE team comprises 8 Beneficiaries who will host the DCs and 6 Associated Partners which participate in the action by providing training and/or secondments, but without the right to charge costs or claim contributions.

CISSE Participants

	Organisation name	Ctry	Short Name
Beneficiaries	UNIVERSITE LIBRE DE BRUXELLES	BE	ULB
	KATHOLIEKE UNIVERSITEIT LEUVEN	BE	KUL
	WEIZMANN INSTITUTE OF SCIENCE	IL	WIS
	THE HEBREW UNIVERSITY OF JERUSALEM	IL	HUJI
	TECHNISCHE UNIVERSITEIT EINDHOVEN	NL	TU/E
	UNIVERSITAET HAMBURG	DE	UHAM
	SYMERES NETHERLANDS BV	NL	SYMERES
	JASCO EUROPE SRL	IT	JASCO
Associated Partners	ARTTIC	FR	ARTTIC
	UNIVERSITY OF PITTSBURGH	US	UPIT
	INSTITUTE OF SCIENCE AND TECHNOLOGY AUSTRIA	AT	IST AUSTRIA
	WESTFAELISCHE WILHELMS-UNIVERSITAET MUENSTER	DE	WWU
	UNIVERSITA DEGLI STUDI DI BRESCIA	IT	UNIBS

	OHME ASBL	BE	OHME

Purpose of this document

This recruitment leaflet intends to advertise the opening of 10 doctoral positions and to inform applicants of the CISSE project and the recruitment process.

No discrimination policy

CISSE is committed to having a fair and discrimination-free recruitment process. Candidates will be selected on the sole criteria of academic excellence with no reference to gender, ethnical origins, sexual orientation, or religion. The principles set out in the European Charter for Researchers and in the Code of Conduct for the Recruitment of Researchers apply.

Project overview

CISSE for Doctoral Candidates

CISSE is a multi-site Doctoral Network aimed at enabling finest quality research training and transfer of knowledge in an interdisciplinary, inter-sectoral, and revolutionary research field.

The CISSE consortium members carry out research at the forefront of a number of interlinked theoretical and experimental disciplines involving: molecular design, synthetic chemistry, organic materials, nanoscience, electrochemistry, chirality, surface chemistry, industrial scale up, development of analytical methods and instrumentation.

CISSE offers a training programme in which theoreticians, spectroscopists, synthetic chemists, physicists, & industrialists will work on the complex and unsolved questions related to chirality and spin. CISSE gathers an interdisciplinary network of experts, from 6 universities and 2 industrial organisations, who will deliver a high-level doctoral education to 10 DCs. 6 associated partners (4 academics, 1 non-profit cultural organization and 1 private company) will complete their scientific and managerial training.

CISSE will educate DCs as professional scientists, but also as innovators and future leaders. The intensive training programme that takes advantage of secondments (2 per candidate) offers DCs the unique opportunity to carry research at the forefront of science.

CISSE for Science

The scientific objective of CISSE is to make a giant leap forward into the knowledge and understanding of the intriguing CISS effect. This entails a list of well-defined goals namely:

- to elucidate the link between molecular structure and spin polarization,
- to use spin polarization to trigger and direct CSB at nano and macro scales,
- to explore the asymmetric synthesis using the CISS effect in (photo)redox reactions,
- to assess the use of CISS effect in multistep syntheses of industrially-relevant molecules,

- to quantify the role of spin-polarization in the intermolecular interactions of biomolecules and to measure energy scale in bio recognition process,
- to understand the role of exchange interactions in CISS effect,
- to develop analytical methods and instruments to detect spectral signature of CISS effect.

Overview of the consortium

The consortium is composed of 8 beneficiaries and 6 associated partners selected for their world-recognized expertise and unique equipment. Among the 8 beneficiaries there are:

- 6 universities,
- 2 industrial organisations, of which 1 SME and 1 major manufacturer of scientific equipment.

The 14 partners conduct cutting-edge research in their sub-disciplines and are used to train DCs.

The research complementarities between partners are multiple and are explained as it follows:

ACADEMIA AND INDUSTRY. 2 beneficiaries (SYMERES & JASCO) conduct applied research, protect and valorise IPR into business. The 6 academic beneficiaries are reputed for their fundamental research and scientific breakthroughs. WIS and HUJI are rather unique for their ability to turn research outputs into business. This academic and industrial duality is evidently at the heart of the cross-sectoral research and training programme.

EUROPE AND MIDDLE-EAST. 6 beneficiaries are from Europe and share a European culture that manifests itself in the way they conduct research and they do business. WIS and HUJI are located in Israel and brings a radically different cultural approach blended in a tradition of scientific excellence.

THEORY AND EXPERIMENTS. UHAM and ISTA do quantum calculations. ULB, KUL, WIS, UPIT, HUJI, TUE, SYMERES, JASCO, UNIBS and WWU develop experimental approaches covering a large set of expertise: molecular design, multistep synthesis, electrochemistry, nanoscience, industrial scale up of chemical processes, development of analytical equipment, chiroptical methods and spectroscopy.

INNOVATIVE AND COMPLEMENTARY STUDIES. Missing molecular structures will be synthesized and made available to study CISS effect thanks to physical and electrochemical experiments. Spin polarization will be used for obtaining enantiomeric excess in chemical reactions and separation processes. A large set of experimental conditions will be varied with the aim to bring missing parts of fundamental knowledge CISS effect.

CISSE has been designed to offer comprehensive training offering scientific knowledge, as well as the complementary technical and research skills. The various profile of the partners will naturally lead them to deliver different training in transferable skills. ARTTIC and OHME will train DCs respectively in the field of project management and art-science creation.

Description of the individual doctoral project of the 10 DCs

DC1 vacancy						
Hired by	ULB	**Degree delivered by**	ULB			
Supervisor	Y. Geerts, P. Losada Pérez					
Project title	"Novel molecular systems for high CISS effect"					
Objectives	To design, synthesize, and characterize molecular systems magnifying CISS effect.					
Expected results	Synthesis of chiral molecular systems with open shell structures. Enantiomeric separation and assessment of e.e. > 99% for mono- and di-radical compounds. Variation of the size of polarizable aromatic core to modulate exchange interactions between localized radicals and delocalized π-electrons. Elucidation of crystal structures. Fabrication of highly ordered thin films. Characterization of magnetic properties in presence and in absence of external electric field. Quantification of CISS effect by various complementary methods, including spin polarized AFM, SQUID, Hall effect, and photoelectron spectroscopy with a Mott polarimeter.					
Secondment n°1	**Host:** HUJI	**Supervisor**	Y. Paltiel, S. Yochelis	**Duration**	3 months	
	Goal: Characterization of magnetic properties in absence and in presence of CISS effect.					
Secondment n°2	**Host:** WWU	**Supervisor**	H. Zacharias, M. Bartsch	**Duration**	3 months	
	Goal: Fundamentals of chiral molecule – spin polarized substrate interactions					
Desired profile of candidates	Synthetic chemist with a sound knowledge of organic chemistry, physical chemistry and materials sciences. To register to the doctoral program, the candidate must own a Master Degree in chemistry equivalent to the one delivered by ULB. Specifically, must have received a sound education in chemistry covering the fields: general chemistry, physics, mathematics, biology, earth science, mineralogy, crystallography, equilibrium thermodynamics, kinetics, biochemistry, analytical chemistry, inorganic chemistry, organic chemistry, spectroscopy, quantum mechanics, statistical mechanics, non-equilibrium thermodynamics, physical chemistry, and polymer chemistry.					
Gross salary (not including employer's social contributions)	For European Union citizens, the gross monthly salary of €2680 that roughly corresponds to a net monthly salary of €2350, to which a mobility allowance of €600 adds, corresponding to a total of €2950 per month. For non-European Union citizens, the gross monthly salary of €2764 that roughly corresponds to a net monthly salary of €2642, to which a mobility allowance of €600 adds, corresponding to a total of €3242 per month.					

DC2 vacancy

Hired by	ULB	**Degree delivered by**	ULB		
Supervisor	Y. Geerts, P. Losada Pérez				
Project title	"Enantioselective preferential physisorption, chemisorption, and dimerization at spin-polarized interfaces"				
Objectives	To demonstrate that spin-polarization can lead to specific e.e.				
Expected results	It has been demonstrated that enantiomers adsorb differently on spin-polarized metallic surfaces and that spin controls the fate of reduced or oxidized species on spin-polarized electrodes. However, few examples are known and no molecular design rules exist. Moreover, the evidences of enantiomeric excess are rather indirect. DC2 will design and synthesize various molecular systems tailored to either adsorb or react on spin-polarized interface. Enantiomeric excess will be assessed locally by STM for systems with preferential physisorption and chemisorption. Adsorption kinetics will be explored with quartz microbalance. Enantioselective oxidative coupling of prochiral monomers to chiral dimers will be performed on spin-polarized electrodes. Conglomerate-forming atropisomers and conformers with various racemization barrier will be used to study their nucleation on various spin-polarized substrates. Enantiomeric excess will be correlated with molecular systems, crystallization conditions, and spin-polarization. Interactions between enantiomers and spin-polarized surfaces will be studied by contact angle measurements. Reaction products will be analysed by NMR and MS. Enantiomeric excess will be measured by chiral HPLC. Experiments will be repeated to ensure reproducibility.				
Secondment n°1	**Host:** KUL	**Supervisor**	S. De Feyter, K. Mali	**Duration**	4 months
	Goal: Probe enantioselective preferential physisorption and chemisorption by STM. Measure enantiomeric excess at nanoscale.				
Secondment n°2	**Host:** WIS	**Supervisor**	R. Naaman, G. Haran	**Duration**	2 months
	Goal: Perform oxidative coupling of prochiral monomers on spin-polarized electrodes.				
Desired profile of candidates	Synthetic chemist with a sound knowledge of organic chemistry, physical chemistry and materials sciences. To register to the doctoral program, the candidate must own a Master Degree in chemistry equivalent to the one delivered by ULB. Specifically, must have received a sound education in chemistry covering the fields: general chemistry, physics, mathematics, biology, earth science, mineralogy, crystallography, equilibrium thermodynamics, kinetics, biochemistry, analytical chemistry, inorganic chemistry, organic chemistry, spectroscopy, quantum mechanics, statistical mechanics, non-equilibrium thermodynamics, physical chemistry, and polymer chemistry.				
Gross salary (not including employer's social contributions)	For European Union citizens, the gross monthly salary of €2680 that roughly corresponds to a net monthly salary of €2350, to which a mobility allowance of €600 adds, corresponding to a total of €2950 per month. For non-European Union citizens, the gross monthly salary of €2764 that roughly corresponds to a net monthly salary of €2642, to which a mobility allowance of €600 adds, corresponding to a total of €3242 per month.				

DC3 vacancy						
Hired by	KUL			**Degree delivered by**	KUL	
Supervisor	S. De Feyter, K. Mali					
Project title	"Visualisation of the impact of spin-polarized surfaces on (supra)molecular physisorption and chemisorption at the nanoscale"					
Objectives	To locally probe, the impact of spin-polarized interfaces on (supra)molecular physisorption and chemisorption phenomena at the nanoscale.					
Expected results	The research will focus on the use of scanning probe microscopy (SPM) (scanning tunnelling microscopy (STM), atomic force microscopy (AFM)), under ambient conditions and at the liquid-solid interface, to probe supramolecular physisorption and chemisorption phenomena at spin-polarized interfaces, whenever possible in real time, using fast-scanning methods. The major aspects are 1) the formation of chiral films of various thickness; 2) investigating the process of spin-induced enantioselective adsorption, and spin-induced deracemization at the level of the formation of self-assembled molecular networks at the liquid-solid interface; 3) inducing and probing enantioselective chemisorption with molecular resolution using scanning probe microscopy 4) exploring the potential of chiral functionalized STM tips on the imaging of chiral/achiral interfaces.					
Secondment n°1	**Host:**	JASCO	**Supervisor**	P. Albertini	**Duration**	2 months
	Goal: benchmarking on-surface enantioselective adsorption with solution composition					
Secondment n°2	**Host:**	UHAM	**Supervisor**	C. Herrmann	**Duration**	4 months
	Goal: understanding the contrast mechanism of chiral STM tips					
Desired profile of candidates	Chemist, physicist, or materials scientist, with a sound knowledge of physical chemistry and materials sciences. You must own a Master Degree in Chemistry, Physics, Molecuar Sciences, or equivalent, and have obtained the degree at least with "distinction". You must have received a sound education in chemistry or physics covering general chemistry, physics, mathematics, thermodynamics, kinetics, spectroscopy, quantum mechanics, and physical chemistry. You must be proficient in English (written and oral). We expect that you have a strong interest in fundamental research, are self-critical, and have the capacity to learn and bring knowledge.					
Gross salary (not including employer's social contributions)	As doctoral scholarship holder, your salary is not subject to income tax deductions. That's the reason why there are no salary scales and gross wages available. The scholarship amount is calculated at the start of your employment agreement. Researcher allowances will be used for the scholarship. For more information: https://www.kuleuven.be/personeel/jobsite/en/phd/phd-information#working-conditions					

DC4 vacancy						
Hired by	WIS			**Degree delivered by**	WIS	
Supervisor	R. Naaman, G. Haran					
Project title	"Elucidation of spin-controlled bio-related interactions"					
Objectives	To explore and quantify the role of spin-polarization in the intermolecular interactions of biomolecules.					
Expected results	The research will be focused on the role of the electron spin in bio-related interactions, like protein-protein association, protein folding, and the search process of enzymes on DNA. Since upon interaction of chiral molecules the charge polarization that accompanied the interaction result also in spin polarization. This spin polarization was found to result in spin exchange interaction when the two reacting species are chiral. This interaction increases the bio-affinity and enhances the reactions' rate. Using various spectroscopic and imaging methods, the forces associated with the spin exchange will be determined as well as the effect of the spin on the reaction rate. The project will be interdisciplinary in nature since it will involve bio-systems, adsorption of bio systems on surfaces and modifying them with chromophores, and the used of atomic force microscopy, optical imaging, and time dependent fluorescence.						
Secondment n°1	**Host:**	TUE	**Supervisor**	E.W. Meijer, G. Vantomme	**Duration**	4 months
	Goal: Preparing chiral chromophores to be interacted with the proteins studied.					
Secondment n°2	**Host:**	UPIT	**Supervisor**	D. Waldeck	**Duration**	2 months
	Goal: Studying electrochemical methods					
Desired profile of candidates	The candidate must have an M.Sc. degree or an equivalent from a reputable institution of higher learning. He/she must have completed their masters thesis in chemistry/biochemistry/physical chemistry/ and have background in spectroscopic methods.					
Gross salary (not including employer's social contributions)	8500 NIS/month (9000 NIS/month from April 2023)					

DC5 vacancy			
Hired by	HUJI	**Degree delivered by**	HUJI
Supervisor	Y. Paltiel, S. Yochelis		
Project title	"Direct measurement of the spin exchange interactions using chiral AFM"		
Objectives	To measure the energy of bio recognition and the interactions of chiral molecules with magnetic substrates.		
Expected results	Optimizing and understanding enantioselective reactions by directly measuring the forces and energies relevant, as a function of chiral molecules, magnetic substrates, distance and temperature. Specifically, Local AFM based on spin exchange interactions and the CISS effect will be utilized to the measurements (Fig. 14).		

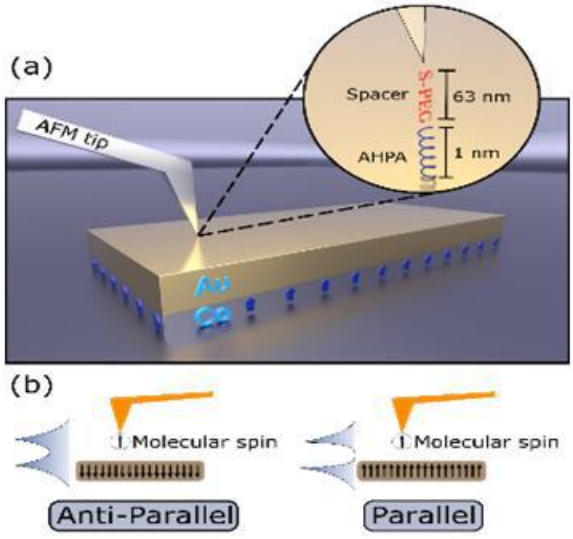

Fig. 14. Spin polarized AFM experiment

The local spin-exchange microscopy, based on the short-range spin exchange interactions, is providing magnetic imaging method. The imaging will be performed at ambient conditions using a conventional AFM tip functionalized with a chiral molecule. The interaction of the chiral tip with different magnetic substrates will be studied. Chiral bio recognition will be explored by the above mentioned local magnetic imaging method based on a conventional chiral molecule functionalized AFM tip. The research will be based on the analysis of the interactions between chiral molecules. DC5 will probe the interactions of the chiral tip with different chiral and nonchiral molecules as well as with opposite enantiomers.

Secondment n°1	**Host:**	ISTA	**Supervisor**	M. Lemeshko	**Duration**	3 months
	Goal: DC5 will go to Lemeshko group studying the breaking of time reversal symmetry in transport through chiral molecules using dissipation.					
Secondment n°2	**Host:**	WWU	**Supervisor**	H. Zacharias, M. Bartsch	**Duration**	3 months
	Goal: DC5 will measure spin polarization for different adsorption density of chiral molecule layers.					
Desired profile of candidates	The candidate must have a M.Sc. degree. He/she must have completed their masters thesis in chemistry/Physics and have background in spectroscopic methods.					
Gross salary (not including employer's social contributions)	Gross Salary 11000 NIS/month					

DC6 vacancy			
Hired by	TUE	**Degree delivered by**	TUE

Supervisor	E.W. Meijer, G. Vantomme					
Project title	"Chiral electrodes for asymmetric electrochemistry"					
Objectives	Exploring the asymmetric synthesis using the CISS effect in (photo)redox reactions.					
Expected results	The project has three major steps to make: 1) Synthetic pathways of supramolecular structures to create stable chiral electrodes for the anode and/or cathode; Inspired by graphitic carbon nitride electrodes, triazine and heptazine-based supramolecular polymers will be prepared and assembled into ordered thin layer to form the chiral electrodes. 2) Optimized CISS effect through the chiral electrodes; 3) Defining a scope and limitations of asymmetric synthesis (enantioselective reduction of highly polarizable ketones/nitriles/nitrones) using the chiral electrodes. As a minor part of the project, the scope and limitations of chiral photo-redox will be studied using the CISS effect.					
Secondment n°1	**Host:**	WIS	**Supervisor**	R. Naaman, G. Haran	**Duration**	4 months
	Goal: Measurements of the spin-selection in chiral electrodes					
Secondment n°2	**Host:**	SYMERES	**Supervisor**	T. Vries, M. Leeman	**Duration**	2 months
	Goal: Optimizing the synthesis of the chiral building blocks					
Desired profile of candidates	Requirements for Candidates: – Master degree in Chemistry, Physical Chemistry, Molecular Sciences, or related discipline – Solid background in organic synthesis and/or polymer chemistry and a keen interest in chirality and material studies. – Good communication skills, fluency in English (written and oral), and a strong motivation to do original, fundamental research in an interdisciplinary team. – Self-critical, capacity to learn and bring knowledge.					
Gross salary (not including employer's social contributions)	We Offer: – A challenging job in a dynamic and ambitious, multidisciplinary research team at Eindhoven University of Technology. Gross monthly salaries € 2222,- to € 2840,- in accordance with the Collective Labor Agreement of the Dutch Universities (CAO NU). Moreover, a 8% bonus share (holiday supplement) is provided annually. We also offer an attractive package of fringe benefits (including excellent work facilities, child care and sport facilities) and we can help you find accommodation. – The candidate is expected to finish the project with a PhD thesis and disseminate the results through, publications in peer-reviewed journals and presentations at international conferences. For more information please visit http://jobs.tue.nl					

DC7 vacancy			
Hired by	TUE	**Degree delivered by**	TUE
Supervisor	E.W. Meijer, G. Vantomme		

Project title	"Photo-switching helical materials for chirality-based magnetic memory device"					
Objectives	To synthesize helical π-conjugated oligomers with well-defined morphologies for photo-controlled chirality.					
Expected results	DC7 will prepare a variety of chiral π-conjugated block co-oligomers containing photo-switches. Upon irradiation with circularly polarized light, these polymers will invert their helicity and switch the orientation of spin-filtering. He/she will study the polymer organization, the chiroptical properties and the spin selectivity in thin films before and after photo-switching. Variation in the design of the block co-oligomers will improve the structure–property understanding from the molecular level to nanoscale and macroscopic properties.					
Secondment n°1	**Host:**	WIS	**Supervisor**	R. Naaman, G. Haran	**Duration**	4 months
	Goal: Measurements of the spin-selection of the photo-responsive structures by conductive magnetic AFM					
Secondment n°2	**Host:**	JASCO	**Supervisor**	P. Albertini	**Duration**	2 months
	Goal: Measurements of chiroptical properties					
Desired profile of candidates	Requirements for Candidates: – Master degree in Chemistry, Physical Chemistry, Molecular Sciences, or related discipline – Solid background in organic synthesis and/or polymer chemistry and a keen interest in chirality and material studies. – Good communication skills, fluency in English (written and oral), and a strong motivation to do original, fundamental research in an interdisciplinary team. – Self-critical, capacity to learn and bring knowledge					
Gross salary (not including employer's social contributions)	We Offer: – A challenging job in a dynamic and ambitious, multidisciplinary research team at Eindhoven University of Technology. Gross monthly salaries € 2222,- to € 2840,- in accordance with the Collective Labor Agreement of the Dutch Universities (CAO NU). Moreover, a 8% bonus share (holiday supplement) is provided annually. We also offer an attractive package of fringe benefits (including excellent work facilities, child care and sport facilities) and we can help you find accommodation. – The candidate is expected to finish the project with a PhD thesis and disseminate the results through, publications in peer-reviewed journals and presentations at international conferences. For more information please visit http://jobs.tue.nl					

DC8 vacancy			
Hired by	UHAM	**Degree delivered by**	UHAM
Supervisor	C. Herrmann		
Project title	First-principles approach to exchange effects in CISS		

Objectives	Establish an understanding of the importance of exchange effects in CISS, by means of first-principles density functional simulations.					
Expected results	At present, no first-principles method exists that is capable of describing the large magnitude of CISS. It has been demonstrated both in experiments and in first-principles simulations that exchange interactions, and their interplay with spin-orbit interactions, play an important role in CISS. By employing and modifying state-of-the-art two-component relativistic density functional theory approaches, we plan to obtain a qualitative understanding of exchange effects in CISS, as well as advances towards a first-principles approach to CISS capable of describing the large order of magnitude of the effect. We will employ and extend both static DFT and combinations of DFT with a Green's function / Landauer approach, and assess the exchange dependence of potential decohering effects such as electron-phonon coupling.					
Secondment n°1	**Host:**	HUJI	**Supervisor**	Y. Paltiel, S. Yochelis	**Duration**	3 months
	Goal: Understand and design interactions between chiral molecules and magnetic surfaces based on first-principles methods					
Secondment n°2	**Host:**	WIS	**Supervisor**	R. Naaman, G. Haran	**Duration**	3 months
	Goal: Developing methods for evaluating the importance of exchange effects in spin polarized electrochemistry					
Desired profile of candidates	Applicants should have - Strong interest in chirality, theoretical chemistry, nanoscience and/or condensed matter physics - (Prospective) master's degree or equivalent in one of these fields or a related subject - Solid background in electronic structure theory. Good basic knowledge of programming languages (in particular Python) is preferable, as well as hands-on experience in electronic-structure calculations. - Solid English (both written and oral) and general communication skills. - Desire to learn and to do original research in an interdisciplinary team					
Gross salary (not including employer's social contributions)	The successful candidate will receive an attractive salary in accordance with the MSCA regulations for Early-Stage Researchers. The exact (net) salary will be confirmed upon appointment and is dependent on local tax regulations and on the country correction factor (to allow for the difference in cost of living in different EU Member States). The salary includes a living allowance of around 3.085 EUR and a family allowance (if applicable). Furthermore, CISSE will offer to take advantage of joint scientific research trainings, transferable skills workshops, and international conferences.					

DC9 vacancy

Hired by	SYMERES	**Degree delivered by**	TUE
Supervisor	T. Vries, M. Leeman		
Project title	"Spin-induced asymmetric synthesis of chiral scaffolds"		

Objectives	To exploit the CISS effect for chiral synthesis of unique building blocks for drug discovery					
Expected results	Proof of concept for asymmetric synthesis of chiral compounds has just been obtained.[2] Initially DC9 will focus on enantioselective photo-redox and electrochemical reactions of model compounds on spin polarized electrodes. Then, research activities will be extended to known chiral catalysts for the synthesis of industrially relevant chiral compounds. Catalysts will be deposited on ferromagnetic substrates and spin-polarization will be used to modulate reactivity to determine how enantiomeric excess can be modulated by external factors. The results will determine the potential of spin technology for drug discovery purposes.					
Secondment n°1	**Host:**	ULB	**Supervisor**	Y. Geerts, P. Losada Pérez	**Duration**	3 months
	Goal: Thin film formation with nanoscale morphologies and long-range order.					
Secondment n°2	**Host:**	TUE	**Supervisor**	E.W. Meijer, G. Vantomme	**Duration**	3 months
	Goal: Optimization and further exploration of the technology to chiral compounds of interest for drug discovery					
Desired profile of candidates	Requirements for Candidates: – Master degree in Chemistry, Physical Chemistry, Molecular Sciences, or related discipline – Solid background in organic synthesis and/or polymer chemistry and a keen interest in chirality and material studies. – Good communication skills, fluency in English (written and oral), and a strong motivation to do original, fundamental research in an interdisciplinary team. – Self-critical, capacity to learn and bring knowledge					
Gross salary (not including employer's social contributions)	Gross salary: 2957-3196 euros depending on the experience of the applicant.					

DC10 vacancy			
Hired by	JASCO	**Degree delivered by**	UNIBS
Supervisor	P. Albertini		

[2] *J. Phys. Chem. Lett. 2021, 12, 5469*

Project title	"Evaluation of CISS effect on chiroptical response and for chromatographic separation"					
Objectives	The objective of the doctoral thesis is twofold: i) to evaluate how CISS effect modify chiroptical response of molecules, and ii) to assess the applicability of chromatographic enantioseparation on spin polarized stationary phase.					
Expected results	CISS effect induces a spin polarization of electrons crossing chiral molecules and a transient intramolecular spin polarization of electrons. The latter should modify the electric or/and the magnetic transition dipole of molecules that in principle should be measurable by spectropolarimetric techniques. However, the strength of the chiroptical response is unknown. That's what will be determined by DC10. The transient intramolecular spin polarization has a dramatic effect on the adsorption of enantiomers on ferromagnetic substrates, which has been exploited for the enantioselective chromatographic separation of enantiomers. However, the proof of principles has been obtained only with peptides and lacks generality. Other classes of chiral molecules will be tested and practicality of the enantioseparation will be assessed.					
Secondment n°1	**Host:**	HUJI	**Supervisor**	Y. Paltiel, S. Yochelis	**Duration**	2 months
	Goal: Perform chromatographic enantioseparation on spin polarized stationary phase					
Secondment n°2	**Host:**	WIS	**Supervisor**	R. Naaman, G. Haran	**Duration**	4 months
	Goal: Search for an chiroptical response of CISS effect					
Desired profile of candidates	Requirements for the candidates: Master degree in Biology, Chemical Engineering, Chemical Sciences or related discipline Good communication skills, fluency in English (written and oral) A background in spectroscopic techniques is preferable.					
Gross salary (not including employer's social contributions)	Gross monthly salary is € 2.650,00 . The recruited DC is entitled to a an additional mobility allowance of € 600,00.					

Recruitment process

Consent:

By applying, candidates agree that all CISSE partners have access to their personal data, for the purpose of the project.

Eligibility criteria:

1) Candidates must own a Master or an equivalent degree allowing them to register as PhD student in one of the academic institutions of the CISSE consortium.
2) Supported researchers must be **doctoral candidates**, i.e. not already in possession of a doctoral degree at the date of the recruitment. Researchers who have successfully defended their doctoral thesis but who have not yet formally been awarded the doctoral degree will not be considered eligible.
3) Researchers must be enrolled in a doctoral programme leading to the award of a doctoral degree in at least one EU Member State or Horizon Europe Associated Country.
4) Recruited researchers can be of any nationality and must comply with the following **mobility rule**: they must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before their recruitment date.
5) Application must be written in English.
6) Application must be complete.
7) Application must be submitted before the deadline.

Additional eligibility criteria might be set by institutions that deliver doctoral diplomas.

For all recruitments, the eligibility of the researcher will be determined at the date of their first recruitment in the action. This status will not evolve over the lifetime of the action, even if they are re-recruited at another beneficiary.

The selection procedure for doctoral candidates is open, transparent and merit-based, in line with the Code of Conduct for the Recruitment of Researchers.

The recruited DCs are entitled to a living allowance, a mobility allowance (600 EUR) and, if applicable, a family allowance for researchers that have a family (either by marriage/marriage equivalent or have dependent children). Family allowance can also be applied for during the fellowship if family status changes. These allowances represent the Community Contribution to salary costs and are as such gross amounts. Consequently, the net salary results from deducting all compulsory social security contributions as well as direct taxes (e.g. income tax) from the gross amounts. Note that social security contributions and taxation vary from country to country. In order to obtain an estimation of the actual net allowances for the DCs, it is recommended to read the vacancies and consult the host organisation.

Application file:

1) A letter of motivation referring to the targeted DC vacancy (with DC vacancy number), explaining why you apply for this position, why you believe you have the necessary skills and knowledge to successfully carry out the research project, and how a PhD would suit your career objectives.
2) A CV with details on education, employment, publications, and eventual first research experience.
3) Two reference contacts.
4) Certified copies of Bachelor and Master diplomas or a certified copy of the Bachelor diploma and a letter informing of the future date of obtaining of the Master degree.
5) Transcripts of the notes obtained for all courses of the Bachelor and Master degrees.

How to apply: Submit your application by email to cisse-recruitment@eurtd.com

The deadline for application is April 15, 2023. The deadline will be extended in absence of suitable candidates. Applications will be evaluated in a continuous way and positions will be filled in as soon as possible. UPDATE: The new deadline for application is **May 30, 2023.**