

AXIS 1: NUCLEAR PHYSICS CENTER

Scientific Advisory Board: meeting n°1





CAESAR WP6 : GRADUATE SCHOOL

Objective: Promotion of the International Nuclear Physics master of UCN

graduateschool-n2p.unicaen.fr



CaeSAR

CAEN, STRATÉGIE
POUR L'ACCÉLÉRATION
EN RECHERCHE





CONTEXT



emm.nucphys.eu

- Erasmus Mundus Master degree on Nuclear Physics NucPhys: two successive projects 2016-2020 & 2021-2025 successfully funded by the EACEA (7 full intakes)
- **Graduate School Normandy Nuclear Physics:**
 - Guarantee the persistence of the programme beyond the Erasmus funding
 - Increase the number of students choosing Normandy for their PhD thesis and beyond
 - Tools for excellence: Excellency scholarships, PhD contracts, internships, tutoring, scientific events

- RIN N2P GS (2021-2025)
- Project 3NC (2024-2029) Axe 7.1
- CaeSAR (2024-2029) WP6



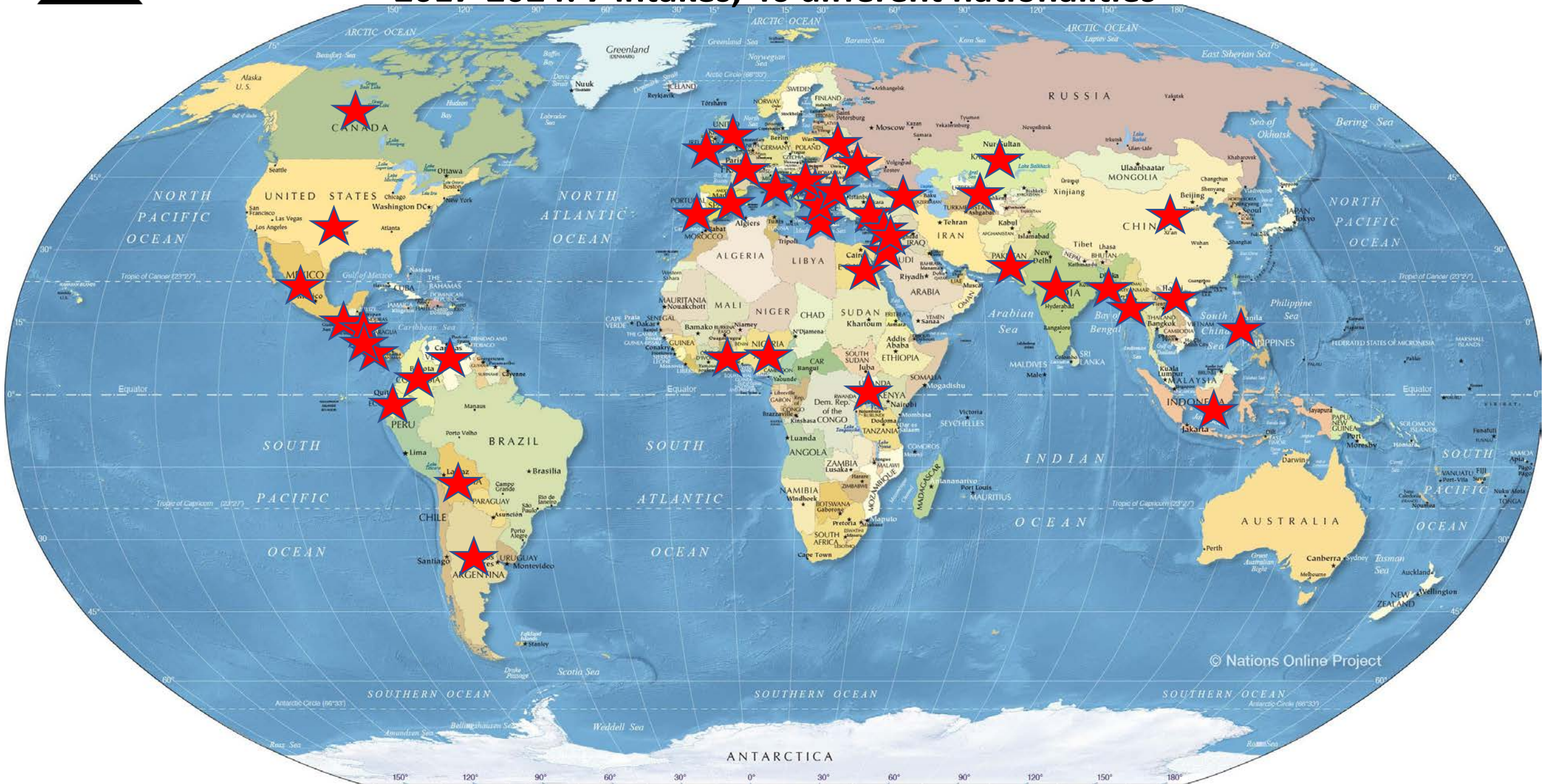
- 2024/2025: Joint degree following the european accreditation approach => increased contribution of UNICAEN from Master 1



Co-funded by the Erasmus+ Programme of the European Union

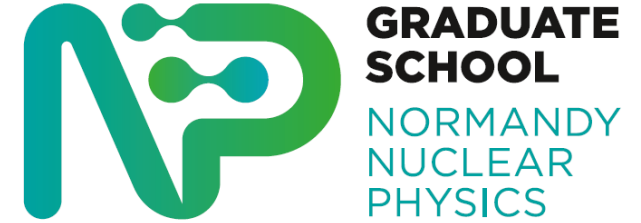


2017-2024: 7 intakes, 46 different nationalities





GS N2P: IMPLEMENTATION



- Students follow the paths of Unicaen's existing master's programme in physics at Unicaen
- Selected students follow a special programme (Label N2P) coincident with the path choice of ERASMUS Mundus students
 - Experiments and instrumentation in large accelerators
 - Theoretical nuclear physics
 - Applications (energy, radiation protection, radiotherapy)
- They are immersed in the labs (part-time internship during S3) from the beginning of M2 and are followed by a personal tutor
- N2P students benefit from special scholarships (Excellency Fellowship)
- Events are organized (visits, advanced seminars, summer schools...)



**GRADUATE
SCHOOL**
NORMANDY
NUCLEAR
PHYSICS

RIN GS N2P (~660 k€)

2021-2022

- Website <https://graduateschool-n2p.unicaen.fr/> , logo, social networks
- 4 scholarships (0 M1+ 4 M2)

+ GANIL Master day, participation to LISA summer school, WiN mentoring event, WNE@Paris, GS course « two infinities days »

2022-2023

- 10 scholarships (3M1+7M2)
- 2 PhD contracts 1/10/22-30/9/25 (A.Lejuez, G.Daviau)

2023-2024

- 7 scholarships (4M1+3M2)

2024-2025

- 19 scholarships (11M1+8M2)
- PhD defences

Axe 7.1 3NC RIN GS N2P (~930 k€)

WP6 CaeSAR (~208 k€)

- 3 PhD contracts, (*contrats doctoraux*)
- 36 excellency scholarships, (*bourses d'attractivité*)
- 1 project manager (*chargé de projet*)

- 18 internship grants (1k€/mois for 6 months) (*indemnités de stage*): 108 k€
- 4 summer schools (*écoles d'été*): 100 k€





ACTIONS UP TO NOW:

- 2 internship grants 2024 : Victor Dumenil (LPC) Zouhir Cherfi (GANIL)
- Organizing committee summer school: F.Gulminelli, M.Marques (LPC), D.Boilley (GANIL)
- Summer school 2025: under review



2021-2022 :

Prénom Nom	Nationalité	Laboratoire	Année	Sujet de stage/thèse master
Anthony Lejuez	France	LPC Caen	M2	Characterization of the simultaneous spin analyser built for the neutron electric dipole moment (nEDM) experiment
Hugo Delille	France	Université Sevilla	M2	Study of the hoyle state band in ^{12}C via inelastic excitations
Elia Pilotto	Italy	Université Padova	M2	In-beam commissioning of the AGATA
Gica Stefanescu	Espagne	Université Catania	M2	Radioactive Disequilibria in volcanic plumes

2022-2023 :

Prénom Nom	Nationalité	Laboratoire	Année	Sujet de stage/thèse master
Ilham Dekhissi	Maroc	CIMAP Caen	M1	Déformation d'un liquide électrofilé à la limite de Rayleigh
Sophie de Saint Vaast	France	LPC Caen	M1	Simulation de débit de dose en gamma
Théo Craquelin	France	GANIL Caen	M1	Conception du dispositif de détection du système MIPPS du projet DESIR
Audrey Anne	France	LPC Caen	M2	Multi-neutron detection for the investigation of exotic nuclei
Laurie Dienis	France	GANIL Caen	M2	Study of ^{68}Ni by neutron adding and removing reactions
Alice Bernard	France	CEA-DAM	M2	Développement d'un outil d'analyse et de visualisation des fonctions d'onde de noyaux d'atome
Alex Cobo Zarzuelo	Espagne	INFN/LNL	M2	The fusion dynamics far below the barrier for $^{12}\text{C} + ^{24}\text{Mg}$
Guillermo Ortega-Ureta	Espagne	LPC Caen	M2	Simulations of PNS experiments in the thermalized VENUS-F subcritical reactor partially unloaded
Ozgur Ozer	Turquie	LPC Caen	M2	Enhancing gamma-ray dose estimation with machine learning techniques
Bernardo Gameiro	Portugal	IFIC-UV	M2	Optimization of imaging techniques for background suppression of stellar NucleoSynthesis reactions



2023-2024 :

Prénom Nom	Nationalité	Laboratoire	Année	Sujet de stage/thèse master
Hugo Fougère	France	GANIL Caen	M1	Intégration numérique à l'ordre 2 de l'équation du mouvement d'un électron/ion dans la structure électromagnétique d'une source d'ions à résonance électronique cyclotronique
Marah Jbaly	Liban	CIMAP Caen	M1	Molecular aggregates in the gas phase: Environmental Effects Post Ion Beam Interaction
Nathan Rousseaux	France	LPC Caen	M1	Étude Bayésienne des paramètres d'oscillation dans les mesures de neutrinos atmosphériques
Maxime Mikluha	France	IP2I Lyon	M1	A Study of the NJL Effective Model of QCD and its Phase Transitions
Ilham Dekhissi	Maroc	LPC Caen	M2	Sensitivity to exotic physics with forbidden beta decays
Marti Rovira*	Espagne	Uni Catania	M2	A variational approach to quantum field theory
Carolina Alvarez*	Espagne	DESY	M2	Investigation of bunch-by-bunch position measurements at PETRA III



2024-2025 :

Prénom Nom	Nationalité	Laboratoire	Année	Sujet de stage/thèse master
Clara Pfeffer	France		M1	
Zoé Bitar	France		M1	
Bernat Carrillo	Espagne		M1	
Daniel Castiblanco	Colombia		M1	
Ruddy Delgado	Costa Rica		M1	
Pablo Canovas	Espagne		M1	
Elena Lopez	Espagne		M1	
Ancy Daniel	India		M1	
Cian Patrick Jordan	Irlande		M1	
Ali Ahmed Jan	Pakistan		M1	
Diego Barajas	Colombia		M1	
Muhammad Sufyan	Pakistan		M1	

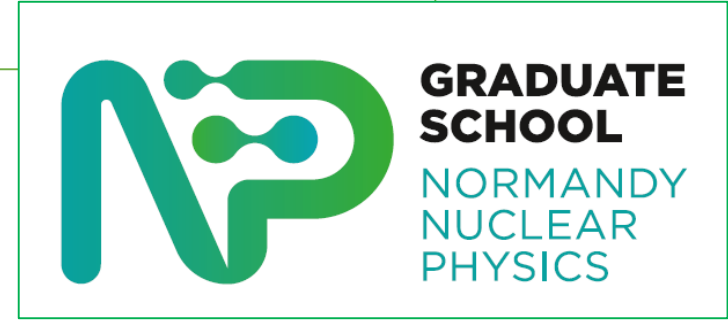


2024-2025 :

Prénom Nom	Nationalité	Laboratoire	Année	Sujet de stage/thèse master
Sacha Mehat	France		M2	
Marah Jbaly	Liban		M2	
Nathan Rousseaux	France		M2	
Maxime Mikluha	France		M2	
Emma Weiler	France		M2	
Batool Almasri	Syrie		M2	
Pablo Nieto Gallego*	Espagne		M2	
Luz Tiscareno*	Mexico		M2	
Muhammad Imtiaz*	Pakistan		M2	



« Master de Physique Université de Caen » Graduate School Paths



**GRADUATE
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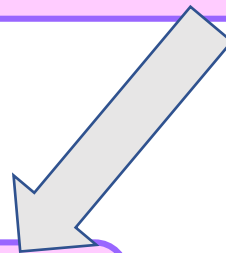
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**Bachelor in Physics
(UCN or ext)**



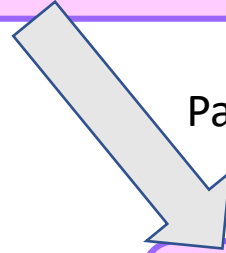
Master 1 - 60 ECTS

Part-time in research lab



**Nuclei Atoms and Collisions
60 ECTS**

Part-time in the industry (« alternance »)



**RadioProtection
60 ECTS**



RÉGION
NORMANDIE



ACTION 6.1.A : GRADUATES SCHOOLS PATHS



RÉGION
NORMANDIE

- The GS N2P is an excellence project of the Normandy Region since
- GS in a nutshell:
 - Three core paths: “**Theory**”, “**Experiments**”, or “**Applications**”
 - A personal progressive **individual program** thanks to the internship and individualized practical projects in all paths
 - **Excellency fellowships**
 - Possibility of Master thesis abroad
 - Visits, seminars, common Erasmus meeting...
- 2 PhD thesis (LPC, GANIL) to be defended in Fall 2024
- 21 excellency scholarships attributed to Master students
- *The 3NC project will allow to: attribute 4-10 extra PhD contracts to the best students, hire a project manager, increase the GS attractivity with extra activities and projects.*

« Master de Physique Université de Caen » Graduate School Paths



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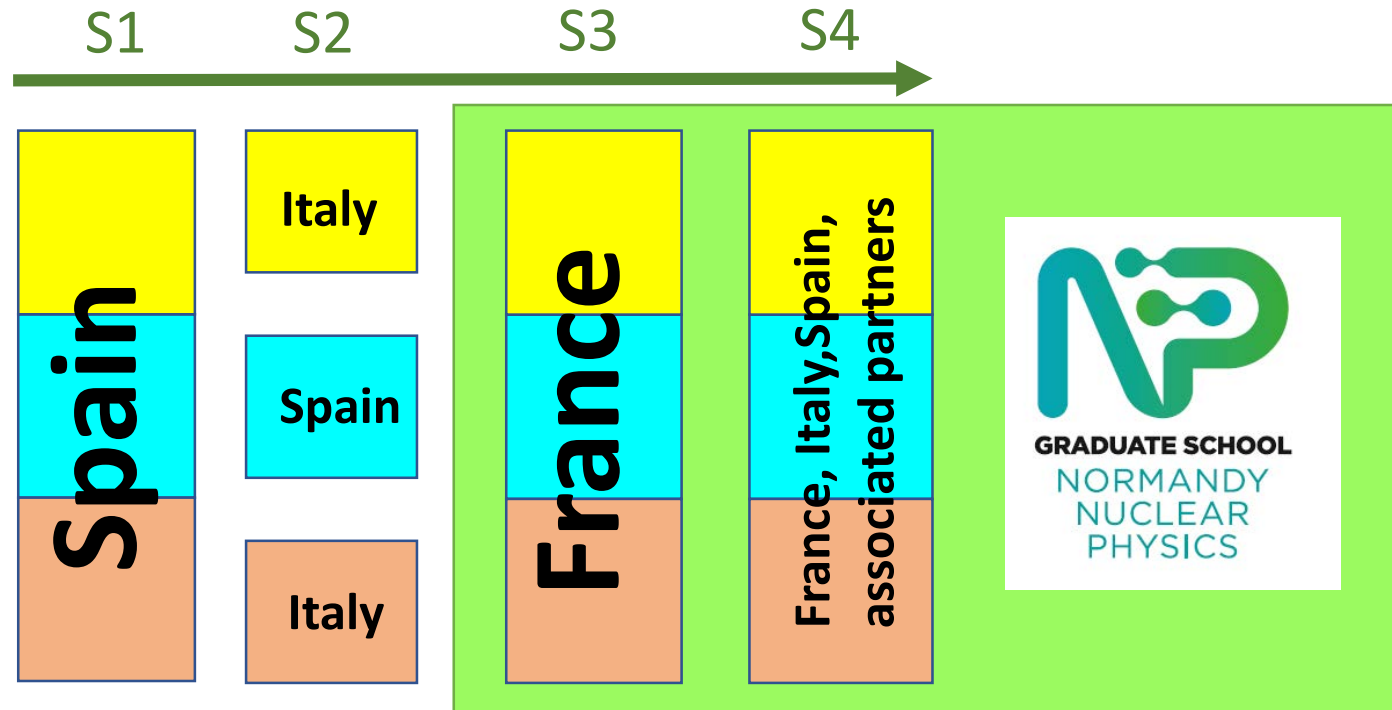
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UNIVERSITÉ
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NORMANDIE



ERASMUS + JMD on Nuclear Physics



-  Experiments and instrumentation in large accelerators
-  Theoretical nuclear physics
-  Applications (energy, radiation protection, radiotherapy)

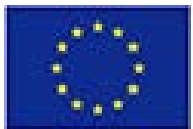


ACTION 6.1.A : GRADUATES SCHOOLS PATHS



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- Erasmus Mundus Master degree on Nuclear Physics NucPhys: two successive projects 2016-2020 & 2021-2025 successfully funded by the EACEA (7 full intakes)
- Consortium of 6 Universities in 3 countries (France, Spain, Italy), 26 associated partners
- ~ 20 students/intake selected out of ~ 150 applications
- 95% successful graduation, 90% continuation in PhD
- Increased visibility and sustainability over time (extra scholarships/year from associated partners)
- 2024/2025: Joint degree following the european accreditation approach => increased contribution of UNICAEN from Master 1
- *The 3NC project will guarantee the persistence of the programme beyond the Erasmus funding*



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ANNEXE 2 : RÉPARTITION DE LA SUBVENTION TEL QUE TRANSMIS

Poste de dépenses	Dépense	Calendrier	Coût total	Financier
Equipement	- Plateforme Génie nucléaire Cherbourg / enseignement salles TP - Plateforme Génie nucléaire Caen / lien enseignement, recherche, industrie	2024-2025	1 368 800 €	CdC / Région / PPrivé
Personnels	3 EC sur 36 mois	Sept. 2025-Août 2028	550 800 €	CdC / Région / PPrivé
	Ingénieur recherche plateforme (36 mois)	Fév. 2026-Fév. 2029	165 600 €	
	Assistant ingénieur de recherche	Sept. 2024-Fév. 2029	162 000 €	
	Chargé.e de projet - suivi	Juin 2025 – Fév. 2029	120 000 €	
	Chargé.e de projet GS	Sept. 2024 – Fév. 229	216 000 €	
	IP réalité virtuelle	Sept. 2024 – Déc. 2027	106 400 €	
	Doctorants (3)	Sept. 2024 – Août 2028	375 000 €	
Personnels / fonctionnement	Chaire de professeur Junior	/	500 000 €	UNICAEN
	Valorisation des master	/	67 450 €	UNICAEN
Prestation	TP numérique – Cherbourg	2024-2025	100 600 €	CdC / Région / PPrivé
Fonctionnement	Bourses d'attractivité	2024-2028	270 919	

- | **A noter** : Les structures impliquées dans le projet 3NC recevront, dès passage en CP, les éléments relatifs à l'engagement des dépenses (dont PFI et eOTP). A date, besoin de suivre les apports Unicaen et dépenses engagées jusqu'alors pour ré-imputation éventuelle.



THÈSES GS

Anthony LEJUEZ – PhD LPC

Gautier DAVIAU – PhD GANIL



BUDGET

Personnel	
Monitorat / tuteur 15h à 60€ brut de l'heure	31 500,00 €
Chargé de projet (mi-temps)	56 875,00 €
Doctorant	
2 thèses	210 000,00 €
missions : 1 000€/doctorant/an	7 000,00 €
Gratification de stage M2	
650€ / mois pendant 4 mois	52 000,00 €
Bourses excellence :	
M1 et M2 : 750€ / mois pdt 10 mois	262 500,00 €
Prestation externe	
communication 10 000€/an	40 000,00 €
Total	659 875€



	Bourses	2021-2022	2022-2023	2023-2024	2024-2025	
Initial	M1	0	5	5	5	15
	M2	5	5	5	5	20
		Total				35 étudiants
		Réalisé	Réalisé	Réalisé	Prévisionnel	
	M1	0	3	4	16	23
	M2	4	7	3	5	19