CAMILLE **CUNIN**

Graduate Student

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Passionate with bioengineering, neurobiology, optogenetics and biomedical imaging
I would like to gain knowledge in these fields through several research experiences before pursuing a PhD.

EXPERIENCE

MARCH 2020 – AUGUST 2020

RESEARCH STUDENT, KAIST UNIVERSITY – DEPARTMENT OF PHYSICS – BIOMEDICAL OPTICS LABORATORY (BMO) – *DAEJEON* The lab is focused on developing novel optical methods based on light scattering, interferometry and light manipulation for the purpose of (1) imaging biological and medical samples, (2) understanding the physics of diseases, and (3) diagnosing and treating the disease. I will work on two projects using label-free quantitative phase imaging and holographic imaging methods. First, to develop a screening tool to guide pathologists by providing immediate tissue characterization and diagnosis for biopsy procedure. Second, to weave artificial intelligence into label-free QPI imaging techniques for deep cytometry.

NOVEMBER 2019 – MARCH 2020

RESEARCH STUDENT, HARVARD UNIVERSITY – ALBERS LAB – MASSGENERAL INSTITUTE FOR NEURODEGENERATIVE DISEASE (MIND) – MGH – *BOSTON* - The Albers Laboratory uses the olfactory system of mice and humans to explore early pathologic events of neurodegeneration. I started working in this lab during my free time to immerse myself in the fields of olfaction, neurodegenerative disorders and cognition. Through this experience, I developed my capacity to catch up on a completely new field, in a short amount of time, by delving deeply into literature. After a month, I started drafting a scientific manuscript reporting a novel algorithm capable of predicting progression to amnestic-MCI or Alzheimer's disease among healthy elderly individuals, based on their scores on both odor naming and odor memory performance.

FEBRUARY 2019 – MARCH 2020

RESEARCH STUDENT, HARVARD UNIVERSITY – THE TEARNEY LAB – WELLMAN CENTER FOR PHOTOMEDICINE – MGH – *BOSTON* Currently working on a challenging project to design a novel, minimal invasive, and high-resolution OCT-imaging device to diagnose Crohn's disease. My research work mainly consists in developing an OCT-TCE device capable of reaching the terminal ileum, in determining imaging criteria for mapping the gastrointestinal tract, and in carrying on ex vivo and in vivo swine studies before going into humans. The first six-months at the Tearney Lab validated my first year of master's degree in General Engineering. I had the chance to pursue my work on this challenging project for six more months (first half of my gap year).

JUNE 2019 – AUGUST 2019

HARVARD – MIT (HST) SUMMER INSTITUTE FOR BIOMEDICAL OPTICS, WELLMAN CENTER FOR PHOTOMEDICINE – MGH – *BOSTON* - In parallel with my internship, I completed a three-month program in biomedical optics at MGH. Through hands-on research experience, this program trains participants in the study and innovation of biomedical optics for improving human health and advancing biological sciences. Students are challenged to explore ways to conduct research responsibly and to achieve the skills to communicate research findings effectively through oral presentations, scientific poster presentation and a large panel of courses on diverse medical or engineering topics.

AUGUST 2018

1-MONTH INTERNSHIP, GRANDS MOULINS STORIONE – *MARSEILLE* - As a first working experience in a laboratory, I discovered how to control wheat's quality by carrying out tests on wheat greats and flour such as measures of humidity and ash contend.

EDUCATION

SEPTEMBER 2017 – AUGUST 2021

MASTER OF SCIENCE IN GENERAL ENGINEERING, ECOLE CENTRALE – *MARSEILLE* - As a graduate student, I am currently doing a gap year in between my first and second year of master's in general engineering. Passionate with biomedical engineering and functional neuroscience, I would like to acquire more experience in this field by doing several internships as a researcher before considering doing a PhD. I will obtain my MSc degree in General Engineering in 2021.

SEPTEMBER 2015 – SEPTEMBER 2017

PREPARATORY CLASSES TO THE GRANDES ÉCOLES D'INGÉNIEURS (PCSI), LYCÉE LOUIS-LE-GRAND – *PARIS* - Preparatory classes are the French equivalent for College but condensed in two years instead of three. It aims at preparing students to enter one of the top-ranked Engineering Schools. I did my preparatory classes in science – major in math, physics and chemistry (PCSI/PC*) in the best public Lycée in Paris.

SEPTEMBER 2012 – SEPTEMBER 2015

HIGHSCHOOL, LYCÉE LOUIS-LE-GRAND – *PARIS* - Graduated from Highschool with highest honors.

SKILLS

• Conduct research protocols • Conduct animal studies • Knowledge of healthcare compliance, laws and regulation • Adaptability and self-motivation • Attention to details • Enthusiastic to learn from others • Team worker • Creative • Task driven

RESEARCH PROJECTS

2020 **SELECTIVE LOSS OF EPISODIC MEMORY OF ODOR PERCEPTS PREDICTS PROGRESSION TO AMNESTIC MCI OR ALZHEIMER'S DISEASE, ALBERS LAB, MIND**, MGH – BOSTON – After statistically analyzing odor memory scores collected in a longitudinal cohort, I took part, as third author, in the writing of a short report disclosing the potential of a selective deficit on episodic odor memory for predicting cognitive decline among cognitively normal elderly individuals. I am currently working on a second manuscript aiming for a global review on existing olfactory-based approaches used to detect early stages of Alzheimer's disease in pre-clinical but asymptomatic individuals.

2019-2020 **OCT-TCE DEVICE FOR DETAILED VISUALIZATION OF THE TERMINAL ILEUM, TEARNEY LAB, WELLMAN CENTER FOR PHOTOMEDICINE**, MGH – BOSTON - Currently working on a challenging project to design a novel, minimal invasive, and high-resolution OCT-imaging device to diagnose Crohn's disease. This 1-year internship in research is providing me with a strong experience in research as I am learning how to conduct research protocols and animal studies, how to validate my experiments and how to present my work through weekly meetings, scientific poster presentation, slam talks or mid-term advancement calls.

2018 **IOT PROJECT – LI-FI**, ECOLE CENTRALE – MARSEILLE - For six months, I have been working closely with researchers studying Li-Fi technology. The aim of this project was to understand how light can spread information. Then, with my team, we laid the foundations for a prototype capable of spreading data via variations of its intensity. As the light cannot penetrate through walls, the signal sent through Li-Fi technology cannot be hacked from a remote location.

2015-16 **DAMPING OF LIQUID SLOSHING BY FOAMS**, LYCÉE LOUIS-LE-GRAND, PARIS - In my undergraduate preparatory classes, I studied the damping effect of liquid sloshing by foams. More specifically, I worked on the damping effect of a beer foam on top of the liquid. I built a model to describe the foam contribution to the damping coefficient through vicious dissipation on the wall of the container.

OTHER PROJECTS

2017 **DEEP LEARNING PROJECT**, ÉCOLE CENTRALE MARSEILLE - The purpose of this AI project was to build an autonomous robot run by an AI algorithm and capable to drive itself on an unknown track and to avoid obstacles. As a project manager, I lead my team to build this robot with Arduino technology and deep learning coding.

2017 **36H CHRONO**, ÉCOLE CENTRALE MARSEILLE Through this thirty-six-hour entrepreneurship challenge, I learnt to build a project, to manage a team, to make an idea grow and become material. Our project consisted in launching a company providing services to improve employee's wellbeing through diverse activities depending on their needs and availabilities. Through this project, I have learnt how to acquire a large amount of knowledge in a couple of hours and to apply them to launch a project while meeting deadlines

AWARDS & ACADEMIC ACHIEVEMENTS

2021 Graduation year (MS degree)
SEPT. 2019 Best slam talk runner-up award for people's choice — at Wellman Scientific Day - MGH
AUG. 2019 Harvard – MIT Summer Institute in Biomedical Optics at MGH
SEPT. 2017 First price of Innovation Challenge – Dyson price
JULY 2015 Graduation from Highschool with highest honors

PUBLICATION

Dhilla Albers A, Keim A, Cunin C, Hyman BT, Gomez-Isla T, Blacker D, Das S, Locascio, J, Albers, MW, Selective loss of episodic memory of odor percepts is associated with progression to amnestic MCI or Alzheimer's Disease in cognitively normal seniors, (2020), *in prep.*

LANGUAGES

- **FRENCH**: Native
- **ENGLISH**: C1
- **GERMAN**: B1
- **SPANICH**: A2/B1

ACTIVITIES

PRESIDENT – Centrale Glisse I relaunched this association to offer Ecole Centrale Marseille students the possibility to practice various surfing sports by providing lessons and facilities at a discount price. Through this project, I have learnt not only how to start from scratch, but also that it is worth trying your ideas, even if not everything works as predicted.

JUNIOR ENTREPRENEUR – Project Manager & Web Specialist at KSI Centrale Marseille As a project manager, my role was to identify client's needs, to write specifications, to draw up provisional budget and planning as well as to draft commercial proposals. My experience as a Junior Entrepreneur strengthened my ability to organize information, to identify priorities and to work efficiency to meet deadlines. As a quality controller, I took part in the quality process by reviewing and validating every study related to web development. It helped me develop my attention to detail and my ability to determine what is relevant information and what is not. Qualities very useful when looking for accurate data while reading scientific papers.

VOLONTEER – Cheer Up! I used to periodically visit children suffering from cancer at the hospital to help them fulfill their projects and dreams. As a first experience with the clinical world, I experienced how to deal with patients and how important innovation in the biomedical engineering field is.

REFERENCES

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