# Camille CUNIN

Graduate Student in Bioengineering and Nanotechnologies

Date of birth: June 10, 1997 (Paris) · Address: 20 rue des Vertus, 75003 Paris, France · Phone: +33 6 47 79 85 59
Email: camille.cunin@centrale-marseille.fr· Online CV/Portfolio: https://camillecunin.github.io/

Passionate about **biomedical engineering**, **neuroscience** and **nanotechnologies,**
I wish to pursue a research career and lead advances in biological sciences and technologies
**to make a difference in the improvement of human health**.

## EDUCATION

**2020 - 2021**
**M.S. in Engineering Sciences / Diplôme d'Ingénieure (2nd year)**
*École Centrale – Lyon* **-** *Major in* ***Bioengineering & Nanotechnologies****.*
Syllabus: human physiology, immunology, dynamics of biological and human systems, biotechnologies, microelectronics, microfluidics, tissue engineering and biomaterials, functionalized thin layers and surfaces, nanostructures, nano-systems, biological interfaces, biocomputing and biostatistics…

**2020 – 2021**
**M.S. in Health Engineering - Medical Imaging Signal and Systems**
*Université Claude Bernard – Lyon*
Syllabus**:** tissue characterization, imaging techniques (US, PET, MRI, CT, X, NIRS), image and signal processing, neuroimaging, machine learning, intellectual property, research protocols, bibliography…

**2017 – 2020**
**B.S. in Engineering Sciences (2018) + M.S. in Engineering Sciences (1st year)**
*École Centrale – Marseille* **-** *Major in* ***Advanced Chemistry and Chemical Engineering*** *– GPA: 3.84*

**2017 – 2020**
**Higher School Preparatory Classes (CPGE) PCSI/PC***
*Lycée Louis-Le-Grand – Paris* **-** *Major in* ***Physics and Chemistry*** *– GPA: 4.0*

**2015 – 2017**
**High School -** Graduated from High School with highest honors.
*Lycée Louis-Le-Grand – Paris*

## HONORS, AWARDS, ACADEMIC ACHIEVEMENTS

**2020** Fundamentals of Neuroscience (3 certified parts) – HarvardX online classes
**2019** Best slam talk runner-up award for people's choice — at Wellman Scientific Day - MGH
**2019** HST-Wellman Summer Institute for Biomedical Optics at MGH
**2017** Grand-prize winner of the ECM Innovation Challenge – Dyson Award

## ONLINE COURSES

*Mar.-July 2020 – Taiwan*

- HarvardX - Fundamentals of **Neuroscience** (3 certified modules)
- AdelaideX - Essential Human Biology - **Cells and Tissues**
- MITX - Introduction to **Biology** - Secret of Life
- EPFLX - Fundamentals of **Biomedical Imaging**
- IBMX - Introduction to **Data Science** & **Data Science Tools**

## EXPERIENCE

**2021** *Mar. – Aug.*
**Master's Thesis - Dr. S. Rezaei-Mazinani's Lab.**
*Mines De Saint-Étienne, Department of Bioelectronics – Gardanne, France*
Development of versatile encapsulation method for **flexible optical neural probe**

**2019 – 2020** *Nov. – Mar.*
**Research Student at The Albers Lab**
*MassGeneral Institute for Neurodegenerative Disease (MIND) – Charleston, MA*

**2019 – 2020** *Mar. – Mar.*
**Research Student at The Tearney Lab**
*Wellman Center for Photomedicine – MGH & Harvard University – Boston, MA*

**2019** *Jun. – Aug.*
**HST-Wellman Summer Institute for Biomedical Optics**
*Wellman Center for Photomedicine – MGH & Harvard University– Boston, MA*

**2018**
**1-Month Research Internship, Grands Moulins Storione –** *Marseille, France*

## RESEARCH PROJECTS

**2020**
**High-efficiency nanowire-based solar cells (GaAs//ITO/Si)**
*École Centrale de Lyon & Institut des Nanotechnologies de Lyon (INL), Lyon*
I joined a project sponsored by the European Commission to gain knowledge on methods assessing performances of semiconductor nanowire-based solar cells made of GaAs//indium tin oxide/Si junctions. To achieve efficiencies above the Shockley-Queisser limit, I explored annealing strategies to reduce the **Schottky barrier** revealed by EBIC microscopy at the GaAs/ITO interface. I also quantified the potential for cost efficient production of these **GaAs/ITO nanowires-based solar cells** compared to planar Si solar cells.

**2019 - 2020**
**Selective loss of episodic memory of odor percepts predicts progression to aMCI or Alzheimer's Disease**
*Albers Lab, MIND-MGH – Charleston, MA*
I evaluated the potential of a selective deficit on **episodic odor memory** for predicting cognitive decline among cognitively normal elderly individuals. I started by screening for existing olfactory-based approaches used to detect early stages of AD in pre-clinical but asymptomatic individuals, gaining knowledge on both **neurobiology** and **neurodegenerative disorders**. Then, I statistically analyzed **odor naming** and **odor memory** scores collected on a **longitudinal cohort** and compared these results to the performances of other odor screening tools. I am currently in the reviewing process for the paper presenting these results.

**2019 - 2020**
**OCT-Tethered Capsule Endoscope device for detailed visualization of the terminal ileum**
*Tearney Lab, Wellman Center for Photomedicine, MGH & Harvard University – Boston, MA*
I worked 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 consisted in both developing an OCT-TCE device capable of reaching the terminal ileum, determining **imaging criteria** for mapping the **gastrointestinal tract,** finding the best way to **hydrophilic coat** the device and carrying on **ex vivo and in vivo swine studies.**

**2018**
**IOT Project – Li-Fi**
*École Centrale – Marseille, France*
For six months, I worked closely with researchers on Li-Fi, a derivative of optical wireless communications. I investigated how to use LED bulbs to transmit data and position between devices through variations of light intensity. I imagined three scenarios for Li-Fi implementation in the context of the Internet of Things, modelized the light distribution and underlined the limitations of the technology in terms of signal loss, data security and interferences with external signals.

**2015 - 2016**
**Damping of liquid sloshing by foams**, *Lycée Louis-Le-Grand – Paris, France*
To make a quantitative analysis of the damping effect of a beer foam on top of a liquid, I built a model to describe the foam contribution to the damping coefficient through vicious dissipation on the wall of the container and validated my model through resonant frequencies measures and experimentations in the lab.

## PUBLICATION, ABSTRACT, POSTER

**2021** 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, (2021), *in prep.*

**2021** Song, D, Cunin C, Tearney GJ, Location-aware Optical Coherent Tomography (OCT) Tethered Capsule Endomicroscopy (TCE) of the Small Intestine, Endoscopic Microscopy XVI, part of SPIE BiOS 2021, PW21B-BO103-16, *abstract*.

**2019** Cunin C, Optical Coherence Tomography Tethered Capsule Endomicroscopy for detailed visualization of the terminal ileum, HST-Wellman Summer Institute for Biomedical Optics, (2019), *poster*.

## OTHER INNOVATIVE & START-UP PROJECTS

**2020** **Global Startup Weekend Covid 19**, **Apr. 24-26 - *Taiwan*** – During this Global Online Startup Weekend, 70 countries around the world called for developers, marketers, nurses, doctors, students, scientists and anyone with an idea to tackle the challenges created by the global COVID-19 pandemic. From Taiwan, I enrolled friends from San Francisco, London and Paris to work on a common project aiming at finding solutions to tackle education-related issues during lockdown in France. Our project ranked #11 among 140 other projects.

**2017** **Deep Learning Project, École Centrale De Marseille** - The purpose of this AI project was to build a reinforcement learning robot, capable of autonomous driving on an unknown track and able to avoid obstacles. Familiar with Raspberry PI technology and robotics, I volunteer as project manager for this project to oversee the different parts, from robot prototype to Arduino technology and deep learning coding.

**2017** **36h Chrono, École Centrale De Marseille** - Through this thirty-six-hour entrepreneurship challenge, I first learned how to brainstorm ideas, to manage a team and to build a business plan. Our project consisted in launching a company providing services to improve employees' wellbeing through diverse activities tailored to their needs and availabilities. Through this project, I acquired a large amount of knowledge on entrepreneurship, which will help in the future, as I will probably launch my own startup(s) and/or lab.

**2015** **Piezoelectric Sensors & Lego® Mindstorms®, Lycée Louis-Le-Grand** - In high school, I joined an Engineering class to program an autonomous robot capable of collecting as many items as possible on a playing area. I built technical Lego® accessories and provided some of them with piezoelectric sensors to trigger specific release levers. With this strategy, my robot was the only one to collect all items in record time.

## LANGUAGES

- **French**: Native
- **English**: Fluent (TOEFL iBT Score: 100)
- **German / Spanich**: Beginner/Intermediate
- **Programming Languages**: Python, Matlab, HTML, CSS, JavaScript…

## SKILLS & INTERESTS

- Ability to make independent decisions and to work both in independent and group settings
- Excellent organizational skills, strong attention to detail and ability to manage deadlines effectively
- Highly inventive, autodidact, eager to learn from others, self-motivated
- Excellent presentation skills (from scientific posters to slam talks at seminars)
- Passionate about innovation and new discoveries

## ASSOCIATIONS & VOLUNTEERING *for an exhaustive list, please visit https://camillecunin.github.io/#asso*

**French Translator** – **Apr. 2020 - Now** – **N95DECON, INC**., a California public benefit corporation, has been formed to support the work of a collection of volunteer scientists, engineers, clinicians, and students from universities across the United States as well as other professionals in the private sector to help disseminate scientific information about personal protective equipment decontamination, including N95 respirators during COVID-19 pandemic (https://www.n95decon.org/).

**Research Volunteer** – **May – Nov. 2019** – **Visual Attention Lab - Harvard Medical School-Brigham & Women's Hospital** – For a few months, I took part in weekly studies to help understand the mechanisms by which attention selects specific items, as well as to evaluate the potential of AI for use in differential diagnosis. This included studies of how to terminate searches without finding the target and studies of the processing of visual stimuli before they are selected by attention for further, more complete analysis.

**Students Representative** – **2019 - Now – Centrale Marseille Alumni (AIECM)** – As an elected representative of my year group, my role is to hold our school year together after graduation, for instance by organizing regular events and seminars to feed the alumni network.

**President - 2017–2018 – Centrale Glisse** – To provide watersports for all, I relaunched this association to offer École Centrale's students the possibility to practice nautical sports (windsurf, kitesurf…), usually costly, at a more accessible price including lessons and facilities. Through this project, I not only developed management skills, but I also learned canvassing to find watersport teachers and sponsors.

**Junior Entrepreneur - 2017–2018 – Project Manager & Web Specialist at KSI Centrale Marseille** - As a project manager, my role was to identify clients' 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 and computer-related topics.

**Hospital Volunteer - 2017–2018** – **Cheer Up!** - I used to periodically visit children suffering from cancer at the hospital to talk about their projects and help them fulfill their dreams. As a first experience with the clinical world, I experienced the in-hospital world and realized how important innovation in the biomedical field is.

## PORTFOLIO *to find detailed versions of my CV and portfolio, please visit https://camillecunin.github.io/*

## REFERENCES

**Dr. Guillermo J. Tearney**, MD, PHD, FACC, FCAP, FNAI Remondi Family Endowed MGH Research Institute Chair Professor of Pathology, Harvard Medical School Massachusetts General Hospital, Department of Pathology Wellman Center for Photomedicine. Boston. Phone: +1 (617) 724-2979. Email: GTEARNEY@PARTNERS.ORG

**Dr. Guillaume Chiavassa**, PHD, Professor of Applied Mathematics and School Advisor at École Centrale de Marseille, 13013 Marseille, France. Phone: (+33) 4 91 05 44 29. Email: guillaume.chiavassa@centrale-marseille.fr

**Dr. Emmanuelle Laurenceau**, PhD-HDR, Institut des Nanotechnologies de Lyon (INL) - UMR 5270, Department of Chemistry and Nanobiotechnology, Professor of Chemistry and Biotechnology at Ecole Centrale de Lyon, 69134 Ecully, France. Phone: (+33) 4 72 18 62 40. Email: emmanuelle.laurenceau@ec-lyon.fr

**Dr. Mark W. Albers**, MD, PHD, Assistant Professor of Neurology at Harvard Medical School; Assistant Neurologist at Massachusetts General Hospital. Boston. Lab Phone: +1 (617) 643-0680. Email: albers.mark@mgh.harvard.edu