

Georges Kanaan

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Education

- MASTER OF OCEANOGRAPHY FROM UNIVERSITY OF WASHINGTON, SEATTLE** JUNE 2023
Focus in Biological Oceanography. Supervised by Dr. Jody Deming. Co-advised by Dr. Jodi Young.
- BACHELOR OF COMPUTER & COGNITIVE SCIENCE FROM UNIVERSITY OF TORONTO** JUNE 2021
Completed courses in AI, NLP, CS Theory, Game Design, and Philosophy among others.
- FRENCH BACCALAUREATE FROM INTERNATIONAL COLLEGE, BEIRUT** JUNE 2017
Graduated with distinction. Science track with a focus in Biology.

Academic Research

- MICROBIAL ENERGETICS**, GRADUATE STUDENT TO DR. JODY DEMING SEPTEMBER 2022 - ONGOING
- Developed a model to understand the required energetic input to support a cryopeg brine microbial community.
 - Conducted a sensitivity analysis of the different inputs to characterize the accuracy of the model output.
 - Accepted abstract to *Microenergy 2022*.
- ARCTIC OIL BIOREMEDIATION**, GRADUATE STUDENT TO DR. JODY DEMING SEPTEMBER 2021 - JANUARY 2023
- Proposed and received a grant to investigate novel bioemulsifiers produced by arctic sea ice bacteria.
 - Developed a plan to characterize the commercial viability of an identified bioemulsifier based on EPA requirements.
 - Cultured multiple species of arctic bacteria to survey their emulsification production capacity.
 - Confirmed emulsification capacity on kerosene, then tested on crude oil.
 - Mentored an undergraduate who continued work on this project for two months.
- NEURAL PLASTICITY & UNSUPERVISED LEARNING**, INDEPENDENT JULY 2019 - MAY 2020
- Recruited and led a team of three undergraduate students, acting as principal investigator and first author.
 - Researched and developed novel ideas to model neural plasticity in neural networks.
 - Presented our research in a second year cognitive science class at the University of Toronto.
 - Published a research paper in a public computer science archive.
- UNIVERSITY OF TORONTO, SCDMS**, RESEARCH ASSISTANT TO DR. MIRIAM DIAMOND MAY - DECEMBER 2020
- Grant from Arthur McDonald Canadian Astroparticle Physics Research Institute.
 - Acquired a knowledge-base in particle physics in order to apply machine learning to physics problems.
 - Researched and engineered both supervised and unsupervised machine learning solutions to discriminate between single and multiple recoil events in the particle detector using HPC techniques on ComputeCanada supercomputers.
 - Worked closely with physicists to understand the data and produce the adequate feature set through feature engineering, along with my partner research assistant.
- UNIVERSITY OF TORONTO, MANNLAB**, RESEARCH ASSISTANT TO DR. STEVE MANN MAY 2019 - APRIL 2020
- Developed a working Brain-Computer interface with Muse EEG, Arduino and Raspberry Pi to perform Steady State Visually Evoked Potentials experiments.
 - Captured the world's first image of vision and of multiple ayinographs, recording the eye's input as a camera using SSVEP, in line with the lab's sousveillance theme. Implemented possibly the first digital lock-in amplifier on iOS.
 - Researched and developed a new way to treat prosopagnosia using a computer vision and mobile applications.
- AMERICAN UNIVERSITY OF BEIRUT**, RESEARCH ASSISTANT TO DR. AHMAD DHAINI MAY - AUGUST 2018
- Rewrote and worked on adapting an existing optical coherence tomography scanning algorithm to different scanner formats.
 - Used machine learning to identify valid corneal scan frames from the original video format.
 - Used OpenCV to detect corneal haze contours and the corneal demarcation line.
 - My contributions and findings directly resulted in a comparative study eligible for publication.

Field Work

- VISIONS'22**, EASTERN PACIFIC OCEAN AUGUST 2022 - 10 DAYS
- Funded to participate on the first leg of the cruise aboard the R/V Thomas G. Thompson.
 - Led a 6 hour dive to sample diffuse flow hydrothermal vent fluid at Axial seamount for Dr. Rika Anderson.
- BIOGEOCHEMICAL EXCHANGES AT SEA ICE INTERFACES**, ARCTIC MAY 2022 - 14 DAYS
- Funded to attend the BEPSII summer field school in Cambridge Bay, Canada in the Arctic.
 - Attended over 30 hours of lecture on sea ice physics, chemistry and biology.
 - Learnt fundamental field techniques for sampling: snow characterization, ice coring, sack hole brine sampling, seawater sampling, PAR measurements.

Teaching

- MARINE POLLUTION**, TEACHING ASSISTANT APRIL - JUNE 2022
- Responsible for grading a class of 50 students on a wide range of marine pollution topics such as plastics, noise, light, etc.
 - Guest lecturer on ocean acidification and guided an in class paper discussion.

Presentations & Posters

MICROENERGY 2022, POSTER: MAINTENANCE ENERGY IN CRYOPEG BRINES

SEPTEMBER 2022

Publications

- Georges Kanaan, Kai Wen Zheng and Lucas Fenaux. 2021. **A Novel Approach to Lifelong Learning: The Plastic Support Structure.** *arXiv 2106.06298.*
- Steve Mann [and 7 others, including Georges Kanaan]. 2020. **Face Recognition and Rehabilitation: A Wearable Assistive and Training System for Prosopagnosia.** *In the 2020 IEEE International Conference on Systems, Man and Cybernetics (SMC' 20).*
- Steve Mann [and 9 others, including Georges Kanaan]. 2019. **The Human Eye as a Camera.** *In the 2019 IEEE International Conference on E-health Networking, Application & Services (HealthCom' 19).*
- Steve Mann [and 12 others, including Georges Kanaan]. 2019. **Keynote – Eye Itself as a Camera: Sensors, Integrity, and Trust.** *In the 5th ACM Workshop on Wearable Systems and Applications (WearSys'19).*

Professional Experiences

NASA – JOHNSON SPACE CENTER, INTERN

JUNE - AUGUST 2020

- Cancelled due to COVID-19.
- Accepted to work on EVA informatics, specifically on EVA Operations System a suite of decision support tools and capabilities for the creation, distribution, and utilization of operationally relevant EVA workflows and data.

NASA – GODDARD SPACE FLIGHT CENTER, NETWORKING INTERN

JUNE - AUGUST 2019

- Procured hardware for network emulation testing within a constrained budget.
- Developed and tested an emulation of a space network both at the hardware and software level to study the implementation of Delay/Disruption Tolerant Network protocols, such as the Bundle Protocol.
- Developed a specialized network management tool that allows for monitoring DTNs, furthering NASA's goal to be a reliable space network provider. This tool was tested on the purpose built DTN emulation hardware.
- Led the development of the network management tool. Including network overview, asynchronous management protocol interface, and visualizations for critical AMP data points. Resulted in an Academic Poster.

ANGHAMI, IOS DEVELOPER INTERN

JUNE - AUGUST 2017

- Independently integrated the music syncing protocol from Airly, an app I developed, as a revenue generating feature for the service.
- Contributed to ongoing development of the mobile app in collaboration with the iOS engineering team.

PRICewaterhouseCOOPERS, CYBER SECURITY INTERN

JULY 2016

- Contributed to writing client side technical specifications which were used in key decision-making discussions.
- Attended company workshops pertaining to their cyber security consulting division, furthering my skills in that area.
- Shadowed professional pen testers for a day, exposing myself to a professional security cracking environment.

SAILY, IOS DEVELOPER INTERN

MAY - JULY 2015

- Assumed responsibility for design, implementation and testing of critical parts of the Saily App in a small team.
- Independently built the Saily Apple Watch app from the ground up.

961 BEER, CONTRACTED IOS DEVELOPER

NOVEMBER 2014 - MAY 2015

- Contracted to develop and manage an iOS app to locate storefronts selling the company's product.
- Responsible for design, implementation, maintenance and release of the app.
- Implemented network features to ensure constant availability of the database in the app.

FOO_, IOS DEVELOPER INTERN

JUNE - JULY 2014

- Contributed to the development of ongoing projects for clients making use of various custom APIs.
- Built an in-house crash-reporting tool using custom APIs to transfer the crash logs to the company's database.
- Researched facial recognition technology demonstrating the OpenCV framework with the capability of recognising facial features such as left eye, glasses, eyebrows.

Awards, Grants & Scholarships

NASA, WASHINGTON SPACE GRANT

SEPTEMBER 2022

- Awarded to fund a NASA science mission directorate project, modeling extreme environment energetics. 4,000 USD.

UNIVERSITY OF WASHINGTON, SCHOOL OF OCEANOGRAPHY, LEO CUP AWARD

SEPTEMBER 2021

- Awarded to the best proposal for oceanographic research tackling pollution, with a special focus on micro plastics. One year of support worth 40,000 USD.

ARTHUR B. MCDONALD CANADIAN ASTROPARTICLE PHYSICS RESEARCH INSTITUTE

MAY 2020

- One semester of support for interdisciplinary research in particle physics. 10,000 USD.

INTERNATIONAL COLLEGE TPE EXCELLENCE AWARD

JUNE 2017

- Awarded to the student with the most original and best performing presentation on the national exam.

APPLE - WWDC SCHOLARSHIP WINNER

JUNE 2015

- Won a scholarship awarded to 350 students. Attended labs and sessions held by Apple engineers including the UI Design Labs. Met Apple engineers and discussed future technologies and ongoing personal projects.

ALTCITY HACKATHON - RUNNER UP (MOVE-COUNTER APP)

MAY 2014

- Designed, developed and pitched a working app in 12 hours with the help of a designer. Other participants were aged between 18 and 30. The app I built, Move-Counter, sported the capability of recording a given move, storing it as a hash then recognizing the recorded move using the built-in accelerometer. The app was later redesigned and published.

Skills

- **Languages:** French, Arabic, English, Spanish.
- **Microbial Lab Techniques:** Sterile technique, culturing, isolation, kerosene emulsification index assay, phenol sulfuric-acid assay, centrifugation, epifluorescence microscopy.
- **Field Techniques:** Ice coring, sack hole brine coring, PAR measurement, snow sampling, seawater sampling.
- **Programming Languages:** Objective-C/C, Swift, Python, PHP, Verilog, Bash, HTML, Markdown, CSS, C++, Java.
- **Computer Science:** Windows, Linux/Unix, macOS, Git, Unity, OpenCV, iOS/macOS SDK (Xcode), Spacy, VPS Deployment, Cydia Substrate, SciKit, PsychoPy, Muse EEG, Tkinter, DTN, ION, CORE, debuggers (gdb, lldb), PyTorch, HPC.

Volunteering

SEATTLE AQUARIUM, MARINE SCIENCE INTERPRETER

MAY 2022 - ONGOING

- Interpret and explain various exhibits on local fauna and flora to thousands of guest.

UW GRADUATE APPLICATION MENTORSHIP PROGRAM, MENTOR

OCTOBER - DECEMBER 2021

- Guided two prospective international undergraduate students through the graduate student application process.

UNIVERSITY OF WASHINGTON CUBESAT TEAM, MEMBER

SEPTEMBER 2021 - ONGOING

- Worked on satellite communication infrastructure.

UNIVERSITY OF WASHINGTON INDOOR FARMING PROJECT, MEMBER

SEPTEMBER 2021 - ONGOING

- Club focused on hydroponics and sustainable farming. Produces food that is donated weekly to the university food bank.

UNIVERSITY OF TORONTO AEROSPACE TEAM, MEMBER

SEPTEMBER 2019 - MAY 2020

- Developed a biological mission concept for the next SmallSat mission involving the study of herpes.
- Reached out to launch companies as well as agencies coordinating biological experiments on ISS to study the feasibility of conducting an experiment in space.

NEUROTECH UOFT, DIRECTOR OF CORTICAL APPS

SEPTEMBER 2018 - MAY 2019

- Responsible for the coordination of the various teams building applications making use of brain computer interfaces.

Press Appearances

- Article in the University of Washington's School of Oceanography about the Leo Cup Award in 2021.
- Article in the University of Toronto news, and news outlet l'Orient le Jour about my NASA internship in 2019.
- Featured in a segment on young developers and entrepreneurs on a major television station in Lebanon.

Projects

SERVER HOSTING: DNS, VPN, & MORE

NOVEMBER 2012 - ONGOING

- Maintained a public facing ubuntu server hosting a myriad of services with 99.9% uptime.
- Hosted and configured a secure VPN based on OpenVPN, and later WireGuard.
- Hosted and configured a Minecraft server complete with automatic backups.
- Hosted and configured a personal DNS service using unbound, complete with ad-blocking capabilities using PiHole.
- Hosted and configured a private Siri proxy service used to get Siri on jailbroken iPhone 4.
- Hosted, configured and made my personal website.

PUBLISHED 11 APPS & TWEAKS

- Published 8 iOS Apps, 3 Tweaks (System modifications distributed through Cydia).
- 3 Tweaks received unprompted coverage from respectable review sources.
- *Bloard* (Tweak) received over a million downloads.
- *Airly* (App) improves on the Precision-Time-Protocol and allows precise music playback across devices.

Personal Experience

- **Lived in:** Beirut, London, Toronto, Washington DC, Strasbourg, Seattle.
- **Well traveled** (over 20 countries), and multilingual, I bring a diverse and unique background to any team.
- **Interests:** music, history, running, skiing, biking, computational neuroscience, space, climate change, oceanography.
- **Self-taught:** I am motivated by my passion for science.