Romain Nith

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EDUCATION

The University of Chicago — Chicago, IL
Ph.D., Computer Science — 2023 – Current
Advisor: Professor Pedro Lopes

The University of Chicago — Chicago, IL
M.S., Computer Science — 2020 – 2023
Advisor: Professor Pedro Lopes

McGill University — Montreal, Canada
B.Eng., Computer Engineering — 2013 – 2019
Advisor: Professor Jeremy Cooperstock

PROFESSIONAL EXPERIENCE

Meta, Reality Lab Research — Redmond, WA
Haptics Research Scientist Intern — 06/2024 – 12/2024

- Prototyped a wearable ring for capturing hand-based haptic interactions using an IMU, microphone, and custom nail-mounted force sensor, implemented on custom PCBs and 3D-printed enclosure
- Implemented robust wired (USB serial) and wireless (WiFi) communication protocols using *Protobuf* for data transfer, with an on-device (ESP32-hosted) webserver accessible from mobile and desktop devices.
- Developed and validated full signal-processing pipeline and characterized device performance by reproducing captured haptic events on vibrotactile actuators in VR

Sony, Computer Science Laboratories — Tokyo, Japan
Research Assistant Intern — 05/2018 – 08/2018

- Developed tethered drone system for human augmentation, enabling extended flight duration by delivering power through a lightweight tether connected to a user-wearable battery pack
- Implemented a 48V grounded power delivery system with a DC-DC converter to reduce cable gauge and stabilize tethered operation
- Integrated a *Parrot Bebop* drone controlled via ROS, using HTC Vive trackers for localization through Unity3D
- Designed functional gesture-based controls for switching operating modes (e.g., telepresence, *follow-me*)

Sony, Computer Science Laboratories — Tokyo, Japan
Research Assistant Intern — 05/2017 – 08/2017

- Implemented a drone telepresence system that enhanced human abilities by mapping a user's head motion to quadcopter control, lowering the skill barrier for UAV piloting and creating an immersive first-person experience via head-mounted visual feedback
- Implemented PID-controller for *user-drone follower* on Unity3D using HTC Vive trackers
- Created Android communication interface enabling data exchange between a DJI drone API and a PC server for real-time control and video streaming via OSC communication protocol

SKILLS

Programming Languages	Python, C/C++, C#
Frameworks	embedded firmware, low-power wireless systems, serial protocols, real-time control systems (PID, sensor fusion), machine learning (PyTorch)
Embedded systems	PCB design, Arduino, ESP32 (BLE/WiFi), Nordic nRF52 (BLE), ARM Cortex-M (SAMD)
Software	KiCAD, Altium Designer, Siemens NX, Fusion360, Unity3D
Prototyping	3D printing (FDM/SLA), soldering & rework, laser/waterjet cutting, woodworking, machine shop (lathe/mill)

RESEARCH EXPERIENCE

Human Computer Integration Lab, University of Chicago — Chicago, IL
Doctoral Researcher — 09/2020 – Current

- Architected a real-time embodied-AI system combining multimodal foundation models, live sensor streams, and electrical muscle stimulation to physically guide user movement; designed synchronization, biomechanical control, and data-integration pipelines (CHI 2026, Best Paper Award, embodied-ai.tech/).
- Built end-to-end systems spanning custom electronics, embedded firmware, desktop software, Unity applications, cloud/local services, AI models, and experimental evaluation.
- Designed and built 5+ wearable haptic systems, integrating IMU, force, and vision sensing with real-time signal processing and closed-loop actuation in C/C++, C#, and Python.
- Developed AR/VR research prototypes in Unity and C# for Meta Quest 2/3 and HTC Vive, integrating wearable hardware with real-time interactive virtual environments.
- Mentored 20+ undergraduate, master's, visiting, and high-school researchers across hardware prototyping, software development, and experimental design; supported multiple publication co-authorships.
- Designed and led user studies with instrumented data collection, developing end-to-end analysis pipelines from raw multimodal sensor streams to statistical evaluation.
- Produced 11+ peer-reviewed publications (5 first-author); 2× Best Paper Award (top 1%), 2× Honorable Mention, Best Demo Award + Guinness World Record.

TMW Center for Early Learning + Public Health — Chicago, IL
Part-time Research Assistant — 10/2020 – 06/2024

- Co-designed and supported manufacturing of a child-safe wearable microphone for quantifying daily word exposure in a consumer language-development product
- Designed and implemented QA hardware test jigs, conducting safety validation for UL certification

TEACHING AND MENTORING EXPERIENCE

Engineering Interactive Electronics onto PCB (CMSC 23230/33230) — Spring 2026, 2025, 2024
Department of Computer Science, The University of Chicago — Winter 2022
Instructor: Professor Pedro Lopes

Inventing, Engineering and Understanding Interactive Devices (CMSC 23220)
Department of Computer Science, The University of Chicago — Winter 2025
Instructor: Professor Pedro Lopes — Spring 2021

Introduction to Human Computer Interaction (CMSC 20300)
Department of Computer Science, The University of Chicago — Fall 2020
Instructor: Professor Pedro Lopes

Mentoring
Mentored 20+ undergraduate, master's, visiting, and high-school researchers across hardware prototyping, software development, and experimental design; supported multiple publication co-authorships.

Services

Program Committee	ACM CHI Late-Breaking Work AC (2023 and 2024) ACM Augmented Humans Paper AC (2025)
Paper Reviewer (over 80 reviews)	ACM CHI, UIST, DIS, ISWC, TEI, SUI, AHs, SIGGRAPH, SIGGRAPH ASIA Recognitions: 5 × **Outstanding Reviewer** (CHI) and 2 × **Outstanding Reviewer** (UIST)
Student volunteer	ACM UIST 2021 (virtual)

EXTRACURRICULAR

McGill Formula Racing Team FSAE — Montreal, Canada

SAE International Formula Program is an engineering design competition consisting of designing, building, and racing a formula race car

Electronics Advisor of electric engine (EV) racing car — 2018 – 2019
Electronics Subteam Leader of combustion engine racing car — 2016 – 2018
Electronics Subteam Member of combustion engine racing car — 2013 – 2016

SELECTED PRESS COVERAGE

Guinness World Records. Featured for Most Precise Bionic Hand Controller. (2023 Edition)

IEEE Spectrum. "Video Friday: Multitasking." (May 2024)

CBS News. "Chicago neuroscientist helps woman with no sense of touch learn more about condition." (Feb 2023)

UChicago News. "High School Students Find Their Place in Computing Through Wearables Workshop." (Jan 2023)

New Scientist. "Mechanical backpack boosts the sensation of jumping in virtual reality." (May 2023)

Hackaday. "Adding Brakes to Actuated Fingers." (Nov 2021)

SELECTED PUBLICATION

[5] Generative Muscle Stimulation: Providing Users with Physical Assistance by Constraining Multimodal-AI with Muscle Stimulation Knowledge
Romain Nith*, Yun Ho*, Peili Jiang, Steven He, Bruno Felalaga, Shan-Yuan Teng, Rhea Seeralan, Pedro Lopes
ACM CHI 2026 Paper– **Best Paper Award** (top 1%)

[4] Adaptive Electrical Muscle Stimulation Improves Muscle Memory
Romain Nith*, Siya Choudhary*, Yun Ho*, Jas Brooks, Mithil Guruvugari, Pedro Lopes
ACM CHI 2025 Paper

[3] SplitBody: Reducing Mental Workload while Multitasking via Muscle Stimulation
Romain Nith, Yun Ho Pedro Lopes
ACM CHI 2024 Paper– **Best Paper Award** (top 1%)

[2] JumpMod: Haptic Backpack that Modifies Users' Perceived Jump
Romain Nith, Jacob Serfaty, Samual Shatzkin, Alan Shen and Pedro Lopes
ACM CHI 2023 Paper

[1] DextrEMS: Increasing Dexterity in Electrical Muscle Stimulation by Combining it with Brakes
Romain Nith, Shan-Yuan Teng, Pengyu Li, Yujie Tao, Pedro Lopes
ACM UIST 2021 Paper – **Best Demo Award (people's choice)**
Guinness World Record for ***Most Precise Bionic Hand Controller***