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Nantes, FRANCE
Canadian (with French work visa)

JULIAN ERSKINE

PhD student interested in robotics research, with practical experience in aerial robotics, control and mechanical analysis

WORK EXPERIENCE & PROJECTS

PhD Student/Researcher

Laboratoire des Sciences du Numérique de Nantes (LS2N)

September 2018 - Present — Nantes, France

Research and Engineering (See pg. 2 for published work):

- Designed, validated and compared decentralized non-linear and predictive control algorithms for fast-manoeuvring drone formations.
- Performed a comprehensive analysis of formation controller singularities
- Developed software for validating scientific work on real UAV systems
- Standardized the use of common software and hardware across the many UAV projects in the lab, decreasing the time required for experiments
- Collaborated on a variety of aerial manipulator prototypes
- Wrote and reviewed papers for IEEE and ASME journals and conferences

Other Works:

- Taught labs (in English and French) on the modelling and control of serial robots and non-linear systems using C++, Matlab and Simulink
- Coordinated the expansion of the drone fleet and testing arena
- Ran UAV demos for audiences ranging from the public to UAV experts

Masters Research Internship

Laboratoire des Sciences du Numérique de Nantes

February 2018 - August 2018 — Nantes, France

- Built, programmed, and tested a prototype with three Pixhawk-based drones for experimental validation of scientific results
- Developed a general methodology for modelling the wrench capabilities of reconfigurable quadrotor-based aerial cable-towed systems
- Designed and simulated a non-linear controller for a payload suspended from multiple quadrotors for accurate dynamic trajectory tracking
- Published results in international conferences and journals

Engineering Internships and Summer Jobs

ATCO Gas — May - Dec, 2014 — Edmonton, Canada
Designed and managed natural gas distribution pipeline projects

Surrette Battery Company — Jan - Apr, 2014 — Springhill, Canada
Assisted in H&S, product quality, and production improvements

Seven Lakes Development — May - Aug, 2016 — Porters Lake, Canada
Worked as a chainsaw operator to clear lots in a newly created subdivision

Big Cove YMCA Camp — Jun - Aug, '11-13,15 — Thorburn, Canada
Management, lifeguarding, and supervision roles at a youth summer camp

THINGS I ENJOY

- Hiking, camping and canoeing trips in the wilderness
- Cooking new international recipes
- Watching sports, particularly ice hockey, rugby, and american football
- Designing and creating things on my 3D printer

EDUCATION

PhD in Robotics (in progress)

École Centrale de Nantes (ECN)

2018 – 2021 — Nantes, France

Thesis title: *Dynamic Control for Bearing-based Formations of Quadrotors*

NSERC PGS-D research scholarship

Master in Advanced Robotics

École Centrale de Nantes

2016 – 2018 — Nantes, France

Thesis title: *Design and Control of Aerial Cable-Towed Systems*

Class Ranking - 1st

ECN masters thesis research scholarship

B.Eng. in Mechanical Engineering

Dalhousie University

2011 – 2016 — Halifax, Canada

Sexton Scholar award

IB renewable entrance scholarship

LANGUAGES

English ★★★★★
French ★★★★☆

SKILLS

Programming
My areas of proficiency are:

C++ | Python | Matlab/Simulink | ROS | PX4 | Linux | Git

Design
I have used the following design tools:

Solidworks | CATIA | 3D Printing

Robotics
My direct experience includes:

Drones | Parallel Robots | Swarms | Non-Linear Control | Optimal Control | Visual Servoing | Serial Robots | Kinematic & Dynamic Modelling

PEER REVIEWED PUBLICATIONS

Journal Articles

- Z. Li, **J. Erskine**, S. Caro, and A. Chriette. Design and Control of a Variable Aerial Cable Towed System. *IEEE Rob. & Aut. Letters*, 5(2):636–643, 2020.
- D. Six, S. Briot, **J. Erskine**, and A. Chriette. Identification of the Propeller Coefficients and Dynamic Parameters of a Hovering Quadrotor from Flight Data. *IEEE Rob. & Aut. Lettres*, 5(2):1063–1070, 2020.
- **J. Erskine**, A. Chriette, and S. Caro. Wrench Analysis of Cable-Suspended Parallel Robots Actuated by Quadrotors UAVs. *ASME Journal of Mech. and Rob.*, 11(2):020909, 2019.

Conference Proceedings

- **J. Erskine**, R. Balderas-Hill, I. Fantoni, and A. Chriette. Model Predictive Control for Dynamic Quadrotor Bearing Formations. In *Proc. of the IEEE ICRA*, Xi'an, China, 2021.
- S. Liu, **J. Erskine**, A. Chriette, and I. Fantoni. Decentralized Control and Teleoperation of a Multi-UAV Flying Parallel Robot Based on Intrinsic Measurements. In *Proc. of the IEEE IROS*, Submitted, 2021.
- **J. Erskine**, A. Chriette, and S. Caro. Control and Configuration Planning of an Aerial Cable Towed System. In *Proc. of the IEEE ICRA*, Montreal, Canada, 2019.
- **J. Erskine**, A. Chriette, and S. Caro. Wrench Capability Analysis of Aerial Cable-Towed Systems. In *Proc. of the ASME IDETC*, Quebec City, 2018.

Submitted or in Preparation

- **J. Erskine**, S. Briot, I. Fantoni, and A. Chriette. Singularities of Rigid Directed Bearing Graphs with Application to Multi-Robot Formation Control. *IEEE Trans. on Rob.*:Submitted, 2021.
- S. Liu, **J. Erskine**, A. Chriette, and I. Fantoni. Decentralized Control and Teleoperation of a Multi-UAV Flying Parallel Robot Based on Intrinsic Measurements. In *Proc. of the IEEE IROS*, Submitted, 2021.

OTHER ACTIVITIES

Unreviewed Presentations

Motion Capture and Drone Research - Organized by Qualisys
April 20, 2021 — Online
Presented: "*Decentralized Vision-Based Control of Multi-UAV Systems*"

Rigidity Theory for Multi-Agent Systems meets Parallel Robotics
November 28-29, 2018 — Nantes, France
Presented: "*Design, Analysis and Control of an Aerial Cable-Towed System*"

Journée GT2-UAV, Groupement de Recherche Robotique
October 12, 2018 — Compiègne, France
Presented: "*Conception et Commande d'une Robot Aerien a Cables*"

Workshops

Summer School on Parallel Kinematic Mechanisms
September 16-21, 2018 — Montpellier, France

Journée Nantional de la Recherche en Robotique
October 14-17, 2019 — Vittel, France

TEACHING

Master in Robotics simulation labs (English)
- Modelling and Control of Manipulators
- Control of Mobile Robots

Engineering simulation labs (French)
- Modelisation de Robots
- Commande de Robots
- Robots Aériens et Sous-marins (drones lab)

PROJECTS SUPERVISED

Master 2 Internship (2021)
Real-time detection of drones for formation control using onboard vision

Engineering Student Project (2021)
Feasibility study for the detection of UAVs from onboard vision

Master 2 Internship (2020)
Second-order visual servoing for dynamic quadrotor formation control

Master 2 Internship (2019)
Design and Control of a Variable Aerial Cable-Towed System

Engineering Student Project (2019)
Design of a simulation interface for quadrotor formation control

REFERENCES

To respect the privacy of my references, contact details will be provided only upon request

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