



Alesia Herasimenka

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RESEARCH INTERESTS

Aerospace Engineering, Optimal Control, Differential Geometry, Optimization, Robotics

AWARDS

Prize & medal Laffitte 2022 for the second year PhD students, Sophia Antipolis

Prize for the best oral presentation, Complex Day 2023, Nice

Prize for the best poster, Journée SMAI-MODE 2022, Limoges

EDUCATION AND PROFESSIONAL EXPERIENCE

- Oct 2020 - Now: PhD thesis in Applied Mathematics
Université Côte d'Azur, CNRS, Inria, LJAD, Nice, France
European Space Agency (ESA), ESTEC, Noordwijk, Netherlands
Topic: Controllability and optimal control of solar sails
- Sep 2018 - Sep 2020: Master in Sciences for Engineering - Advanced Systems and Robotics
High honors, grade 16.45/20, ranking 1/37
Sorbonne Université (with ENSAM-ParisTech), Paris, France
Research internship at **ONERA**, Paris, France
Topic: New techniques of relative pose estimation between satellites
Research internship at **Carleton University**, Ottawa, Canada
Topic: Station-keeping of solar sails for geoengineering
- Sep 2015 - May 2018: Bachelor Cursus of Master in Engineering - Mechanics
High honors, grade 15.75/20, ranking 4/160
Sorbonne Université, Paris, France
Erasmus, **KTH Royal Institute of Technology**, Stockholm, Sweden
Internship at Institute of Intelligent Systems and Robotics, Paris, France
Topic: Development of a kinematic model based on inverse geometry of a robot
- Sep 2013 - May 2016: Bachelor in Economics and Management
High honors, grade 15.23/20, ranking 6/428
Université Paris-1 Panthéon-Sorbonne, Paris, France
Thesis: Shadow Banking: difficult but necessary regulation

PROJECTS AND COLLABORATIONS

ESA, *Numerical methods of convex optimization*, contract no. 4000134950/21/NL/GLC/my
ct (control toolbox) project, Inria, *Optimal control algorithm for solar sails*

IA & Companies week, Métropole Côte d'Azur, *Accessibility to breast cancer screening centers by public transport*

Competition Stardust-R of ESA, *Space debris: the origins*

Projet manager of *Experimental rocket* with CNES, successfull launch. Prize CNES of the best experimental rocket,
Prize GIFAS 2019

TEACHING AND INTERNSHIP SUPERVISION

- Feb 2022 - Aug 2023: Supervision of a final Master's internship at Inria, Sophia Antipolis, France
Topic: Optimal control of solar sails for a sun occultation mission
- Sep 2020 - Now: Teaching: Numerical Analysis, Continuum Mechanics
Department of Mathematics, Polytech Nice, France

PUBLICATIONS

Journal papers

A. Herasimenka, L. Dell'Elce, J.-B. Caillau, J.-B. Pomet. Controllability Properties of Solar Sails. **Journal of Guidance, Control, and Dynamics**, 2023, in press.

Preprints

J.-B. Caillau, L. Dell'Elce, A. Herasimenka, J.-B. Pomet. On the controllability of nonlinear systems with a periodic drift. Submitted to **SIAM Journal on Control and Optimization**

A. Ellery, A. Herasimenka. Space-based geoengineering from lunar resources. Submitted to **Acta Astronautica**

Conference papers

A. Herasimenka, A. Farres, L. Dell'Elce. Station-keeping under conical constraint on the control force. *International Conference on Astrodynamics Tools and Techniques*, June 2023, Sopot, Poland

A. Herasimenka, L. Dell'Elce, A. Farres. Controllability of satellites on periodic orbits with cone-constraints on the thrust direction. *Space Flight Mechanics Meeting*, January 2023, Austin, Texas, US

L. Dell'Elce, A. Herasimenka, N. Baresi. Efficient numerical solution of the low-thrust Lambert problem. *Space Flight Mechanics Meeting*, January 2023, Austin, Texas, US

A. Herasimenka, J.-B. Caillau, L. Dell'Elce, J.-B. Pomet. Controllability test for systems with constrained control. Application to Solar Sailing. *European Control Conference*, Juillet 2022, London, UK

A. Herasimenka, L. Dell'Elce, J.-B. Caillau, J.-B. Pomet. Impact of optical properties on the controllability of solar sails. *International Conference on Astrodynamics Tools and Techniques*, June 2021, Sopot, Poland

Invited talks

Seminar, Jet Propulsion Laboratory, NASA, January 2023, Pasadena, California, US

Brijuni Conference, August 2022, Brijuni, Croatia

LightSails Workshop, May 2022, Luxembourg, Luxembourg

Seminar for PhD students, ENSTA, Institut Polytechnique de Paris, April 2022, Palaiseau, France

Conferences and seminars

Complex Day of Université Côte d'Azur, February 2023, Nice, France

Space Flight Mechanics Meeting, January 2023, Austin, Texas, US

International Astronautical Congress, September 2022, Paris, France

European Control Conference, Juillet 2022, London, UK

KePassa Conference, Juin 2022, Logroño, Spain

Journées sur les Mathématiques de l'Optimisation et de la Décision, June 2022, Limoges, France

Conférence sur Optimisation Franco-Germano-Portugaise, Mai 2022, Porto, Portugal

Congrès des Jeunes Chercheurs en Mathématiques Appliquées, October 2021, Palaiseau, France

Seminar for PhD students, Inria, October 2021, Sophia Antipolis, France

Young Applied Mathematicians Conference, September 2021, Leuca, Italie

Le Monde des Mathématiques Industrielles, March 2021, Sophia Antipolis, France