



## ALEXANDRE LABAU

Titulaire d'un **double diplôme d'ingénieur en mécanique et énergétique** entre **KTH École Royale Polytechnique de Stockholm** et **Grenoble INP - ENSE3**. Je souhaite mettre mes compétences au service de la **production d'énergie nucléaire** au sein d'une entreprise **internationale**.



### Téléphone

+33 7 86 34 54 97



### Email

alexandrelabau@outlook.fr



### LinkedIn

<https://www.linkedin.com/in/alexandre-labau/>

## LANGUES

- **Français** : Langue maternelle
- **Anglais** : Advanced Cambridge certification
- **Espagnol** : Intermédiaire

## ATOUTS

- Rigueur et sens de l'organisation
- Capacité d'adaptation
- Communication
- Goût du travail en équipe

## CENTRES D'INTÉRÊT

- Sports ( **Handball** : Champion Gironde 2016-2017 et 2017-2018 et **Judo** : ceinture marron)
- Musique ( **Guitare** )

## Formation



**2021 - 2024 : Double diplôme d'ingénieur en mécanique et énergétique, KTH École Royale Polytechnique de Stockholm**

- **Classé 7<sup>e</sup> mondiale selon le classement ARWU de Shanghai.**
- **Cours** : Mécanique des fluides avancée, Modélisation mécanique par éléments finis et structures légères (déformations élastiques et plastiques, fatigue, rupture, instabilité de flambement, analyse modale), PLM.



**2021 - 2024 : Diplôme d'ingénieur en mécanique et énergétique, Grenoble INP - ENSE3**

- **Cours** : Mécanique des solides, Conception et modélisation, Mécanique des structures, Transferts thermique, Modélisation et analyse d'écoulements, Écoulements diphasique, Hydraulique des écoulements en charge, Simulation numérique pour les fluides et la thermique, Management de projets.

**2018 - 2021 : CPGE, Lycée Gustave Eiffel, Bordeaux**

- PCSI puis PSI\* (Physique / Sciences de l'ingénieur)

## Expériences



**09/2024 - 05/2025 : Ingénieur mécanique à l'Agence Spatiale Européenne (ESA) \***

- Suivi de projets pour l'implémentation des nouvelles technologies et de nouveaux processus de fabrication. CAO d'équipements mécaniques pressurisés. Développement d'une application d'analyse mécanique en Python pour la maintenance prédictive, disponible sous licence ESA et présentée lors d'une conférence européenne. Suivi énergétique des infrastructures de l'ESA.



**01/2024 - 03/2024 : Étude et conception mécanique générale des équipements d'un véhicule pressurisé \***

- Projet supervisé par Christer Fuglesang, premier astronaute suédois.
- Réalisation du modèle CAO et coordination des tâches, communication efficace au sein d'une équipe internationale de 25 personnes.



**06/2023 - 08/2023 : Stage ingénieur mécanique générale et des fluides à l'Université Polytechnique de Catalogne \***

- **CAO, FEM & CFD** : Modélisation et simulation mécanique des structures et mécanique des fluides sur l'interaction de différents pantographe-caténaire en totale autonomie (Ansys Workbench, Fluent, DesignModeler).



**06/2022 - 06/2022 : Stage ouvrier Caterpillar, Échirolles**

- Monteur sur les lignes d'assemblages, modification de la visualisation des plans de CAO, études ergonomiques.

**09/2022 - 09/2023 : Membre du Bureau International des Étudiants**

- Accueil et intégration de plus de 1000 étudiants internationaux.

## Compétences

- **CAO & FEM** : SolidWorks 3DEX, Catia V5, Abaqus, ANSYS.
- **Programmation et simulation** : Python, Simulink, Matlab, C, C++.
- **CFD** : ANSYS Fluent, OpenFOAM sur Linux
- **Bureautique** : LaTeX, Microsoft Office

\* **Lettre de recommandation jointe à la suite de ce document.**

# Sommaire des documents suivants



- Fiche d'appréciation stage de fin d'études de :

**Michael Mallon** JP in Digital Spacecraft Mechanical Design & Verification

---

Email [michael.mallon@esa.int](mailto:michael.mallon@esa.int) | Phone (+31) 641360355



- Lettre de recommandation de :

**Michael Mallon** JP in Digital Spacecraft Mechanical Design & Verification

---

Email [michael.mallon@esa.int](mailto:michael.mallon@esa.int) | Phone (+31) 641360355

**Nicoletta Wagner** Space Transportation Infrastructure Project Manager

---

Email [nicoletta.wagner@esa.int](mailto:nicoletta.wagner@esa.int) | Phone (+33) 649210413



- Lettre de recommandation de :

**Robert Arcos Villamarin** UPC Associate Professor - Mechanical Engineering Department

---

Email [robert.arcos@upc.edu](mailto:robert.arcos@upc.edu) | Phone (+34) 937398053



- Lettre de recommandation de :

**Christer Fuglesang** KTH Professor, Former ESA Astronaut, Director KTH Space Center

---

Email [cfug@kth.se](mailto:cfug@kth.se) | Phone (+46) 87906465

## IDENTIFICATION

Nom de l'Entreprise - Company name, ESA

Nom - Prénom de l'ingénieur Responsable - Name of the supervisor Michael Mallon, Dr.-Ing.

Nom - Prénom de l'Elève - Name and surname of the student Alexandre Labau

## DEVELOPPEMENT DES COMPETENCES/ SKILL DEVELOPMENT

Merci de préciser dans quelle mesure le stage a permis de développer l'une ou plusieurs de ces compétences métiers de l'ingénieur(e) Ense3 - Please specify the extent to which the work placement has enabled the engineer to develop one or more of the following professional skills :

Modéliser des phénomènes naturels et physiques, et des systèmes technologiques - Modeling of natural and physical phenomena and technological systems

- |   |  |  |  |
|---|--|--|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input checked="" type="checkbox"/> Très Bon / Very good | <input type="checkbox"/> Non concerné / not involved |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input type="checkbox"/> Excellent / Excellent           |  |

Concevoir une solution face à un problème technique : un système, un produit ou un service - Design a solution to a technical problem, a system, a product or service

- |   |  |   |  |
|---|--|---|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             | <input type="checkbox"/> Non concerné / not involved |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |  |

Exploiter une installation, un système ou un procédé en maîtrisant les risques - Operating a plant, a system or a process by controlling risks

- |   |  |  |  |
|---|--|--|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average       | <input checked="" type="checkbox"/> Très Bon / Very good | <input type="checkbox"/> Non concerné / not involved |
| <input type="checkbox"/> Passable / Below average   | <input checked="" type="checkbox"/> Bon / good | <input type="checkbox"/> Excellent / Excellent           |  |

Evoluer dans un environnement complexe et international : dans un groupe, dans une organisation, dans la société - Evolve in a complex international environment : in a group, an organization, society

- |   |  |   |  |
|---|--|---|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             | <input type="checkbox"/> Non concerné / not involved |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |  |

Prendre des initiatives, innover et entreprendre - Take initiatives, innovation and entrepreneurship skills

- |   |  |   |  |
|---|--|---|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             | <input type="checkbox"/> Non concerné / not involved |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |  |

Agir en professionnel responsable et en acteur d'une transition durable - Acting as a responsible professional and a player in a sustainable transition

- |   |  |   |  |
|---|--|---|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             | <input type="checkbox"/> Non concerné / not involved |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |  |

Compte-tenu de la politique menée dans le domaine de la RSE à l'école, l'élève a-t-il (elle) contribué à des projets ou discussions au sein de votre entreprise sur ce sujet ? Given the school's CSR policy, has the student contributed to any projects or discussions on this subject within your company?

- |   |  |   |  |
|---|--|---|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             | <input type="checkbox"/> Non concerné / not involved |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |  |



## COMPORTEMENT PENDANT LE STAGE - BEHAVIOUR DURING THE INTERNSHIP

Le comportement de l'élève vous a paru - What do you think about student's behaviour :

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |

Son degré de motivation - His/her motivation :

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |

Ses facilités d'intégration à une équipe de travail - his/her integration into a working team :

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input checked="" type="checkbox"/> Très Bon / Very good |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input type="checkbox"/> Excellent / Excellent           |

Son sens de l'organisation - his / her sense of organisation :

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input checked="" type="checkbox"/> Très Bon / Very good |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input type="checkbox"/> Excellent / Excellent           |

Son sens des responsabilités professionnelles - his/her sense of professional responsibility :

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |

Remarques générales sur le comportement/General comments on the behaviour :

*Alexandre showed exagorant initiative on building sensors and integrate them with the proposed MC methods.*

## TRAVAIL EFFECTUE ET RESULTATS - WORK DONE AND RESULTS

Le travail accompli par l'élève vous a paru - What is your impression on the work performed by the student?

1 - En volume - about volume :

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |

2 - En qualité - About quality

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input type="checkbox"/> Très Bon / Very good             |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input checked="" type="checkbox"/> Excellent / Excellent |

3- En technicité – About technical nature

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Insuffisant / Insufficient | <input type="checkbox"/> Moyen / Average | <input checked="" type="checkbox"/> Très Bon / Very good |
| <input type="checkbox"/> Passable / Below average   | <input type="checkbox"/> Bon / good      | <input type="checkbox"/> Excellent / Excellent           |

4- Le produit élaboré, le développement effectué, l'étude technico-économique réalisée vous paraissent-ils ? - The product made, the development reached, the technical and economical study carried out is :

- ☐ Insuffisant / Insufficient    ☐ Moyen / Average    ☒ Très Bon / Very good  
☐ Passable / Below average    ☐ Bon / good    ☐ Excellent / Excellent

5- Transmission et réutilisabilité du travail effectué ?

- ☐ Insuffisant / Insufficient    ☐ Moyen / Average    ☐ Très Bon / Very good  
☐ Passable / Below average    ☐ Bon / good    ☒ Excellent / Excellent

Remarques générales/General comments :

Alexandre's drive and inference skills are excellent.  
 For the future more routine and problem reflection is envisioned  
 to work self-standing. For this Alexandre is splendidly prepared and I  
 sense great prospect for his future in engineering & sciences.

#### DEFINITION DE L'ETUDE/DEFINITION OF THE STUDY

L'étude proposée était-elle ? About the proposed study :

- ☐ Mal définie / Undefined    ☐ Assez mal définie / Poorly defined    ☒ Bien définie / Clear    ☐ Très bien définie / Very well defined

Le type d'étude proposée vous semble-t-il convenir au profil de nos élèves ? Does the type of study match the profile of our students ?

- ☒ Oui    ☐ Non

Avez- vous pu suivre l'élève comme vous le souhaitez ?/ Have you followed the student like you wished ?

- ☒ Oui    ☐ Non

Avez- vous pu mener un entretien de fin de stage avec l'élève ? / Were you able to conduct an end-of-course <sup>?</sup> interview with the student?

- ☐ Oui    ☒ Non

Remarques générales/ General comments

---



---



---



---

#### LE MEMOIRE DU STAGE/ Internship report

Contenu / Content

- ☐ Insuffisant / Insufficient    ☐ Passable / Below average    ☐ Moyen / Average  
☐ Bon / good    ☒ Très bon / Very good    ☐ Excellent / Excellent

- ☐ Insuffisant / Insufficient    ☐ Passable / Below average    ☐ Moyen / Average  
☐ Bon / good    ☒ Très bon / Very good    ☐ Excellent / Excellent

Impression générale / General comments :

---

---

---

En termes d'un recrutement éventuel, comment recommanderiez-vous ce candidat ? In terms of hiring, how would you recommend this candidate ?  
(This is an assessment from the company and not in any case a commitment from the company towards the student)?

Based on his reference skills, yes. But for our work more self-standing work is required. I would consider Alexandre well prepared for an entry level position.

---

---

---

Nous vous remercions d'avoir pris le temps nécessaire pour remplir cette enquête dans l'intérêt de l'élève accueilli en stage.  
Thank you for taking the time to complete this survey in the interests of the student on placement.

## Letter of Recommendation

Dear Hiring Committee,

It is with great pleasure that we write this letter of recommendation for Mr. Alexandre Labau, who has been working as an intern in the Directorate of Space Transportation on the Ariane 6 Transition Program at Daumesnil, from September 2, 2024, to May 28, 2025.

Mr Labau's contribution to our manufacturing digitalisation initiatives for manufacturing, logistics, and sustainability. In this respect, he developed an application for Smart Manufacturing featuring Digital Twins (CAD) and Predictive Maintenance through Machine Learning to detect pattern anomalies in real time (Python) so to reduce downtimes, costs and energy consumption of ESA assets.

His work on sensor development and implementation showcases a rare combination of technical expertise and practical ingenuity. From the meticulous design and fabrication of sensors, including sophisticated C++ programming and custom CAD housing creation, to the establishment of a comprehensive data pipeline for real-time analysis and visualisation, to the seamless pipeline of data acquisition, signal retrieval, processing, and real-time display thanks to the dashboard application he developed. This application also features a CAD module that offers a detailed, interactive view of the asset in question.

Furthermore, Mr. Labau's deployment of an industrial-grade smart sensor for Audio Classification Transformers underscores his forward-thinking approach and alignment with ESA's commitment to leveraging cutting-edge technologies.

Throughout his internship, Mr. Labau has proven to be a very responsible and passionate intern with good communication skills, being able to discuss, present and document the results of his work precisely and concisely. Mr. Labau demonstrated a strong, independent work ethic and the ability to evolve autonomously and adapt quickly. Through personal initiative, Mr. Labau was able to identify problems, suggest solutions, implement them and present his work as he did at the AI@ESA event organized in ESTEC, gathering experts in artificial intelligence in various fields of application.

Given the quality of Mr. Labau's work, we have decided to extend his internship period.

Overall, we consider that the work developed by Mr. Labau has been relevant for the section and its projects and was of great interest to ESA. In conclusion, I highly recommend that Mr. Labau be given a chance to pursue his professional career in your company.

**Nicoletta  
Wagner**

Digitally signed by  
Nicoletta Wagner  
Date: 2025.02.27  
15:45:41 +01'00'

(Nicoletta Wagner, Space Transp. Infrast. Project Manager)

**Michael  
Mallon**

Digitally signed by  
Michael Mallon  
Date: 2025.02.26  
14:18:02 +01'00'

(Michael Mallon, Dr.-Ing., Supervisor)





Stockholm, 21<sup>st</sup> March 2025

To whom it may concern,

I am glad to give my strong recommendation for Mr. Labau.

I know Alexandre Labau from the Mechanical Engineering program at KTH Royal Institute of Technology, and in particular through my own course Human Spaceflight that he just finished with good result. During the extensive project work, I have noted Alexandre's engagement and very good performance.

I am fully convinced that Alexandre will be a great asset in any space-related work environment and contribute in general to a positive environment.

Sincerely,

Professor Christer Fuglesang, former ESA Astronaut  
Director KTH Space Center  
KTH Royal Institute of Technology  
Teknikringen 8  
100 44 Stockholm  
Sweden 1 (1)



**Laboratori d'Enginyeria Acústica i Mecànica**  
UNIVERSITAT POLITÈCNICA DE CATALUNYA

20th February 2025

For whom it may concern,

I have the pleasure to write this reference letter in favour of Alexandre Labau, who completed an internship at the Universitat Politècnica de Catalunya - Barcelona Tech (UPC) which I supervised. Throughout this period, he has demonstrated excellent technical skills in CAD and FEM applied to computational fluid dynamics calculations, and has proved a valuable member of our research team.

From the beginning, Alexandre stood out for his seriousness, his autonomy and his organization qualities. He adapted rapidly into our workflows, efficiently dealing with tasks while paying close attention to detail. A particular asset is his curiosity and desire to learn. His ability to work independently and proactively was remarkable, enabling him to manage complex engineering problems with a modicum of close supervision.

I have not the slightest doubt that he will be a valuable member of any engineering team. His dedication, efficiency and strong technical skills make him an excellent candidate for a position in mechanical engineering. I highly recommend them for this opportunity without hesitation.

In case you require any further information about Alexandre, please do not hesitate to contact me.

Robert Arcos Villamarin  
Associate Professor  
Universitat Politècnica de Catalunya - Barcelona Tech (UPC)  
CATMech - Centre for Advanced Technologies in Mechanics  
Mechanical Engineering Department  
ESEIAAT  
C/Colom, 11 08222 Terrassa - Barcelona  
Tel: +34-937398053  
robert.arcos@upc.edu

A handwritten signature in black ink, appearing to read 'Robert', with a long horizontal stroke extending to the right.