

# ALEXANDRE DABY-SEESARAM

Born on 12<sup>th</sup> April 1996  
(28 years old)  
French



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Normalien Doctor  
“Agrégé” of mechanics

## Curriculum Vitae

### Syllabus

- 2024 -** **Postdoctoral researcher** in the Solid Mechanics Lab of Polytechnique (UMR 7649, École Polytechnique, IPP, CNRS, MÈDISIM Team, INRIA, Palaiseau, France)
- Goal :** Individualisation and real-time simulation of a lung model using **model-order reduction techniques**; from theoretical tools to clinical application for patients with *idiopathic pulmonary fibrosis* (IPF).
  - In collaboration** with M. Genet
- 2020-2023** **PhD** at the Laboratory of Mechanics Paris-Saclay, LMPS (UMR 9026, Université Paris-Saclay, CentraleSupélec, ENS Paris-Saclay, CNRS) and at the CEA Saclay (SEMT, CEA Saclay)
- Title :** *Towards an optimal multi-query framework based on model-order reduction for non-linear dynamics*
  - Supervision :** D. Néron, A. Fau
  - Defence** on the 1<sup>st</sup> of Decembre 2023
  - Jury :** D. Rixen (president), A. Gravouil (reviewer and examiner), F. Chinesta (reviewer and examiner), U. Nackenhorst (examiner), M. P. Santisi d’Avila (examiner)
- 2016-2020** **École Normale Supérieure Paris-Saclay**
- Normalien Student in the Mechanics department
  - 2020 Master 2** Modelisation and simulation of structures and coupled systems for mechanics (MS2SC)
  - 2019 Master 2** Post-graduate teaching training (M2 FESup)
  - 2019 Agrégation** of engineering and industrial sciences
  - 2017 Master 1** Mechanics of structures and materials (MMS)
  - 2016 Bachelor** Saphire training (Applied sciences in physics and engineering for research and teaching)
- 2014-2016** **CPGE** Lycée Hoche, Versailles
- 2015** Mathematics, Physics and engineering sciences (MPSI)
  - 2016** Physics and engineering sciences (PSI\*)
- 2014** **A-levels (Baccalauréat)** “série S”
- With highest honours

## Professional experience

- 2024 -**      **Research** at LMS as a postdoctoral researcher
- |      Goal : Individualisation and real-time simulation of a lung model using model-order reduction techniques ; from theoretical tools to clinical application for patients with *idiopathic pulmonary fibrosis* (IPF).
- 2020-2023**      **Research** at LMPS as a PhD candidate
- |      Title : *Towards an optimal multi-query framework based on model-order reduction for non-linear dynamics*
- 2020-2023**      **Teaching** at École Polytechnique as a teaching assistant - 64h/year
- |      General mechanics, Vibrations, Thermodynamics, Experimental methods
- 2020**      **Research** at LMPS as part of a Master 2 Research internship - 6 months
- |      Title : *Model reduction in non-linear dynamics for visco-plasticity problems*  
    |      Supervision : D. Néron, A. Fau
- 2019**      **Teaching** for Ellipses, writing of a book to prepare students for the Grandes Écoles entrance exams - Corrections and commentaries
- |      Physique-chimie PSI-PSI\* Concours X, ENS, CentraleSupélec, Mines-Ponts, CCINP
- 2019-2020**      **Teaching** at “lycée Hoche” - Versailles - 64h
- |      SII oral examinations (colles) in PCSI preparatory classes in industrial engineering sciences
- 2018**      **Research** at Trinity College - Dublin, Ireland as part of a Master 1 research internship - 4 months
- |      Title : *Predicting the acoustic absorption of meta-materials using a combination of analytical and numerical approaches*  
    |      Supervision : H. Rice
- 2017-2018**      **Research** at ENS Paris-Saclay as part of a Master 1 research project - approx. 100h
- |      Title : *Loading step and arc-length adaptation methods for non-linear hyperelasticity computations*  
    |      Supervision : E. Baranger

## Publications

- |      1 article in a peer-reviewed international journal  
    |      5 international conferences  
    |      2 national conferences  
    |      1 book preparing for the CPGE PSI competitive entrance exams

## Skills

### English IT

Fluent (C2 at the Cambridge Advanced exam)  
Programming tools : Python, Matlab, Simulink, Octave, HTML  
Scientific software : Cast3M, Catia  
OS : Linux, MacOS, Windows  
System administration : Management of a Debian server hosting various services (cloud, ssh, git, etc.)  
Other software : L<sup>A</sup>T<sub>E</sub>X, Inkscape, Gimp, OpenOffice, Microsoft Office

# Publications

## Articles published in journals indexed in a database

- 2023** ▶ **Daby-Seesaram, A.**, Fau, A., Charbonnel, P.-É., & Néron, D. (2023). A hybrid frequency-temporal reduced-order method for nonlinear dynamics. *Nonlinear Dynamics*, 111(15), 13669–13689. doi.org/10.1007/s11071-023-08513-8

| DOI : <https://doi.org/10.1007/s11071-023-08513-8>

| Quartile : Q1 - Nonlinear Dynamics

- 2024** ▶ **Daby-Seesaram, A.**, Fau, A., Charbonnel, P.-É., & Néron, D. (2023). Model-order reduction framework for non-linear dynamics problems involving multiple non-parameterised loading configurations for damage assessment

| Status : Under review

## Papers presented at international and national conferences

- 2024** ▶ **Daby-Seesaram, A.**, Fau, A., Charbonnel, P.-É., & Néron, D. Réduction de modèles en dynamique non-linéaire pour la simulation de structures soumises à une famille de chargements. 16ème colloque national en calcul des structures, May 2024, 83400 Hyères-les-Palmiers, France

| HAL : <https://hal.science/hal-04582103>

- 2023** ▶ **Daby-Seesaram, A.**, Fau, A., Charbonnel, P.-É., & Néron, D. Enhanced LATIN-PGD in a multi-query framework. 6th International Workshop on Model Reduction Techniques MORTech, Nov 2023, Gif-sur-Yvette, France

- 2023** ▶ Daby-Seesaram, A., Fau, A., Charbonnel, P.-É., & **Néron, D.** Model reduction for multi-query simulations in nonlinear solid dynamics. 6th International Workshop on Model Reduction Techniques MORTech, Nov 2023, Gif-sur-Yvette, France

- 2023** ▶ **Daby-Seesaram, A.**, Fau, A., Charbonnel, P.-É., & Néron, D. Towards a model-order reduction strategy for nonlinear dynamics parametric simulations. 9th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering, Jun 2023, Athens, Greece

- 2022** ▶ **Daby-Seesaram, A.**, Fau, A., Charbonnel, P.-É., & Néron, D. Reduced-order modeling methods for the construction of virtual charts in nonlinear dynamics. 8th European Congress on Computational Methods in Applied Sciences and Engineering - ECCOMAS Congress 2022, Jun 2022, Oslo, Norway

- 2021** ▶ **Daby-Seesaram, A.**, Fau, A., Charbonnel, P.-É., & Néron, D. Model-order reduction for nonlinear dynamics including nonlinearities induced by damage. 6th ECCOMAS Young Investigators Conference, Jul 2021, Valence, Spain.

| DOI : <https://doi.org/10.4995/YIC2021.2021.13255>

- 2022** ▶ **Daby-Seesaram, A.**, Fau, A., Charbonnel, P.-É., & Néron, D. Réduction de modèles pour la construction d'abaques numériques pour les problèmes non linéaires en dynamique vibratoire. 15ème colloque national en calcul des structures, Université Polytechnique Hauts-de-France [UPHF], May 2022, 83400 Hyères-les-Palmiers, France

| HAL : <https://hal.science/hal-03717959>

## *Book*

**2019**

- ▶ Writing of a preparation book for the entrance exams to the Grandes Écoles for the PSI, published by Ellipses.
- ▶ Physique-chimie PSI-PSI\* Concours X, ENS, CentraleSupélec, Mines-Ponts, CCINP

This book contains a large number of sample oral exam exercises, with answers and comments, plus advice and details on how to best prepare for the orals. The exercises cover the CPGE PSI physics syllabus, including general mechanics, fluid mechanics, thermodynamics, signal and power electronics and electromagnetism.