

Yasmina Rania Elmore

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<https://yasminaelmore.github.io>

EDUCATION

M.S. Aeronautics and Astronautics – *Stanford University*

June 2025

Relevant Courses: Classical Dynamics, Spacecraft Design, Design for Additive Manufacturing, Design and Manufacturing, Analysis of Structures, Numerical Methods for Compressible Flows, Silver Pendant Project, Introduction to Mechanics of Composite Materials

M.S Mechanical Engineering – *ENSTA Paris, Institut Polytechnique de Paris, France* GPA: 3.9/4.3

Sept 2023

Relevant Courses: Thermomechanical Problems in Structures Numerical Analysis, Waves and Vibration in Mechanical Systems, Finite Element Analysis (FEA), Fatigue of Materials and Structures, Introduction to Computational Fluid Dynamics (CFD)

B.S. in Engineering – *ENSTA Paris, Institut Polytechnique de Paris, France* GPA: 4.0/4.3

Sep 2022

Relevant Courses: Optimization, Dynamical Systems, Continuum Mechanics, Digital Signal Processing

EXPERIENCE

Hinge Lock-in Design for Thick Origami Solar Arrays – *Product Realization Laboratory, Stanford University, USA*

Jan 2025 – Present

- Designing a spring-loaded hinge lock-in mechanism to prevent back-driving of solar arrays after deployment avoiding hinge fatigue, and withstanding impacts from micrometeorites
- Prototyping the hinge using Fusion 360 with generative design and shape optimization, and 3D printing the model

Boom Mechanism and Sunshade Spacecraft Design – *Spacecraft Design Laboratory, Stanford University, USA*

Sep 2024 – Present

- Class design project under the supervision of Dr. Sakovsky and Dr. Arya to create a deployable 20m x 20m 3-layer membrane sunshade sail-boom subsystem for large scale satellite using origami engineering and inspired by the ASC3 mission developed by NASA and DLR
- Conceptually designed the coiling mechanism of HTA40/MR60H carbon fiber collapsible tubular mast (CTM) booms, and the unfolding mechanism for the Miura-Ori packaged sunshade membrane
- Created a custom algorithm to optimize the preliminary design parameters of CTM booms, ensuring structural stability without buckling or vibrations, while maintaining low thickness of the booms and meeting requirements to be stowed
- Designed and prototyped a second model of the sail-boom subsystem mechanism and membrane packaging using Mylar sheets and 3D printing
- Currently testing the model using gravity compensation with a cart and rail design, similar to the one used for the Starshade project developed by JPL

Stanford Hypersonic Aircraft and Spacecraft Researcher – *Farhat Research Group, Stanford University, USA*

Sep 2023 – Apr 2024

- Developed the theoretical backend for the novel chemically reactive hypersonic fluid flow simulations in AERO-F, an in-lab custom codebase to perform simulations for any type of fluid flow
- Performed verification of custom hypersonic fluid flow simulation software using Batch and SLURM on super-computers

Michigan Fluid Dynamics Researcher – *Scientific Computing and Flow Physics Laboratory, University of Michigan, USA*

May – Aug 2023

- Led analysis of vortex ring dynamics using a C++-based Navier-Stokes numerical solver. Verified and validated the house-made solver developed by the lab
- Optimized the resolution of the patch-based Adaptive Mesh Refinement, leading to a 34.12% reduction in percentage difference between the numerical model and the theoretical model of reference and improving the alignment of numerical and theoretical circulation crucial for the accuracy of the simulation results
- Co-authored a paper in *Physics of Plasmas* (2024) titled “Feasibility of an experiment on clumping induced by the Crow instability along a shocked cylinder” with Dr. Wadas and Dr. Johnsen

Connecting Rod Design for a Car Engine – *Mechanical Engineering Department, ENSTA Paris, France*

Feb – Mar 2023

- Designed a reference and an optimized connecting rod for use in an automotive engine
- Performed static, buckling, and vibrational simulation and analysis to determine mechanical properties and deformation mode of the device using FEA tools available in 3DEXperience
- Administered a modal analysis for vibration load characterization in 3DEXperience

Spinning Droplets Optimization Researcher – *French Physicists Tournament, ENSTA Paris, France*

Sept 2022– Feb 2023

- Developed a custom experimental setup, including a 30 kHz high-speed camera, to measure the rotation of a water droplet after impacting a hydrophobic surface with hydrophilic patterns
- Optimized hydrophilic patterns and water droplet properties to maximize the water droplet rotation rate
- Defended experimental process and results to a panel of five judges. Gold medalist at French Physicists' Tournament 2023

Office of Children Health Protection Intern – U.S. Environmental Protection Agency (EPA), Washington D.C., USA

July – Aug 2022

- Participated in developing the 2023 budget proposal for the Children's Health Protection Office (OCHP) for Congress, achieving a 10% funding increase with \$1,637,000 granted for the office's projects
- Led meetings to help office members communicate environmental challenges to a non-professional audience

ECG Signal Filtering Using Empirical Modal Decomposition – Lycee Condorcet, Paris, France

Sept 2020– July 2021

- Implemented Empirical Mode Decomposition Algorithm (EMD) in Python for ECG signal filtering to detect tachycardia arrhythmias in context of development of the Wireless Body Area Network
- Filtered signals from the MIT-BIH database after adding randomized high-frequency noise and baseline drift
- Compared performance of EMD with other digital filtering methods such as Savitzky-Golay filtering method or digital low pass filter by evaluating the mean square error (MSE)

SKILLS

Technical skills: Python, C/C++, Julia, MATLAB, 3DEXPERIENCE, CATIA, SolidWorks, Autodesk Fusion 360, Simulink, Linux, SLURM, Batch, 3D Printing, Anaconda, GitHub, Bambu X1E, FormLabs Form

Machine Learning: Q-learning, Reinforcement Learning, Supervised Learning, Semi-supervised Learning, Unsupervised Learning

Manufacturing Processes: Forming, Milling, Turning (lathe), Welding, Sand casting, Joining, Laser cutting, CNC, Fused Filament Fabrication (FFF), Fused Deposition Modeling (FDM), Stereolithography (SLA)

Languages: English (Fluent), French (Fluent), Spanish (Fluent), Arabic (Intermediate), and Mandarin (Intermediate)

AWARDS

Award for Vocation (2023) – Foundation Marcelin Bleustein-Blanchet de la Vocation, France: Selected among 1700 students nationwide as one of the 20 students to receive this award recognizing academic excellence and inspirational impact.