BAZIN Maxime

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M.S. Mechanical Engineering Student @ University of Michigan
Seeking a Mechanical Engineering Internship in Design, Simulation, and Experimental Methods

Education

M.S. in Mechanical Engineering **Sept. 2025 - Present**
University of Michigan, School of Engineering *Ann Arbor, USA*

- Coursework: Comp. Fluid Dynamics, Advanced Fluid Mechanics, Comp. and Data-Driven Methods in Engineering

B.S. & M.S. in Mechanical and Industrial Engineering **Sep. 2023 - Present**
Arts et Métiers Institute of Technology - ENSAM *Paris, FR*

- Coursework: Mechanics (Fluid/Solid), Material Science, CAD, Additive Manufacturing, Programming

B.S. in Physics, obtained with honors **Sep. 2021 - June 2023**
Paris-Saclay University (Ranked 3rd in Continental Europe) *Saclay, FR*

- Coursework: Mathematics, General Mechanics (Fluid/Solid), Electromagnetism, Quantum Mechanics

Projects

Design and Optimization of a Glenoid Shoulder Implant **Jan. 2025 – June 2025**
Laboratory of Biomechanics – IBHGC (ENSAM, CNRS) *Paris, FR*

- Reviewed experimental and FEM studies on glenoid loosening to define design objectives and constraints
- Characterized implant material (cross-linked UHMWPE) through IR, DSC, and WAXS analyses and performed fixation tests under static and cyclic loads
- Developed and optimized implant geometry (angled pegs, perforated keel) in CATIA. Validated mechanical stability through FEM simulations in Abaqus

Optimization of a Capping Machine – Cam Mechanism Design **Jan. 2025 – June 2025**
Laboratory for Product Design and Innovation – LCPI (ENSAM, CNRS) *Paris, FR*

- Designed and dimensioned a vertical cam and sliding joint based on throughput and compression requirements
- Integrated a KRV-72-PP cam follower and validated geometric choices (non-interference, non-lift-off, Hertzian pressure)
- Performed analytical calculations and FEA (Abaqus) to confirm buckling resistance and system robustness

Industrial Defect Classification – Challenge Data ENS **Jan. 2025 – June 2025**
ENS Paris – Valeo Data Science Competition *Paris, FR*

- Built and improved deep learning pipelines (CNN V2, ResNet50, PaDiM) with modular preprocessing, class weighting, and data augmentation to handle imbalanced industrial defect datasets
- Benchmarked transfer learning and anomaly detection approaches, boosting rare class detection and overall model robustness
- Automated the submission workflow, achieving a final **macro-precision of 0.94** on the official challenge platform

Design of a Centrifugal Pump for Heart Failure **Sept. 2024 - Jan. 2025**
Laboratory of Fluid Engineering and Energy Systems - LIFSE (ENSAM, CNRS) *Paris, FR*

- Design and mechanical sizing of a centrifugal pump, based on experimental and theoretical models
- Performed CFD simulations of the system using StarCCM+
- Currently 3D-printing a prototype to conduct experimental tests on reduced-scale models

Design of a Magnetic Guiding Device for Vascular Cell Seeding **Sept. 2024 - Jan. 2025**
Laboratory for Product Design and Innovation – LCPI (ENSAM, CNRS) *Paris, FR*

- Designed a magnetic guidance system to position particles inside a carotid model
- Modeled Stokes drag and magnetic forces to define control parameters
- Reconstructed a 3D artery from DICOM data and prototyped a physical test model

Design and optimization of an Aircraft Brake System **Sept. 2024 - Jan. 2025**
Laboratory for Product Design and Innovation – LCPI (ENSAM, CNRS) *Paris, FR*

- Designed a complete aircraft brake system, integrating 3D modeling and technical drawings
- Performed calculations for heat dissipation, shaft bending, bearing sizing, and bolt preload
- Validated thermal dissipation and structural integrity via FEA of the brake disc and shaft under load

Design of an Airbus Helicopter H125 "Écureuil" **Jan. - June 2024**
Institute of Mechanical Engineering Bordeaux - I2M Bordeaux (ENSAM, CNRS) *Bordeaux, FR*

- Initial approach to the app Generative Shape Design on 3DEXPERIENCE through the design of a helicopter
- Selected appropriate lift and drag parameters by incorporating a NACA airfoil profile for the blades
- Designed the helicopter's components and performed simulations of aerodynamic forces using CATIA V5

Design of a Biomimicry-inspired Wind Generator "CityWind" **Sept. 2023 - June 2024**
Project for ADV-Tech, a startup focused on developing advanced and sustainable technologies *Bordeaux, FR*

- Designed a wind generator inspired by biomimicry to enhance urban energy solutions
- Developed and sized the full kinematic chain components (from blades to turbines)
- Conducted mechanical analysis of the gear's resistance using bending/contact pressure resistance criteria

Undergraduate Project in Numerical Methods for Physics **Sept. 2022 - Jan. 2023**
Université Paris-Saclay *Saclay, FR*

- Numerical resolution of the Schrödinger equation to study quantum tunneling
- Programmed a solver implementing RK2, RK4 and Euler's method, resulting in a GIF animation of the simulation

Undergraduate Research Project **Jan. 2020 - June 2021**
Lycée Parc de Vilgénis *Massy, FR*

- Studied the behavior of bridges under static and dynamic loads
- Developed models of concrete bridge decks (simple, reinforced, and doubly reinforced)
- Measured and analyzed their resonance frequencies to compare structural behaviors

Experience

Engineering Intern **May - July 2025**
Fluid Engineering and Energy Systems Laboratory - LIFSE (ENSAM) *Paris, FR*

- Rebuilt motor–pump alignment in 7 weeks, restoring concentricity and enabling reliable experimental campaigns for future studies
- Engineered ±0.10 mm laser-cut & CNC stainless-steel fixtures, eliminating leaks and stabilizing pump measurements
- Coordinated CAD, GD&T & CNC workflow with PhD researcher and ENSAM prototyping center, cutting downtime >50 %

Assembly Operator Intern **June - July 2024**
Stellantis *Poissy, FR*

- One-month internship as a production line operator for the assembly of the DS3 Crossback and Opel Mokka
- Worked in the door assembly sector, responsible for plugging electrical harnesses and setting the interior elements of the doors
- Developed strong teamwork and communication skills, contributing to the overall success of the production line

Research Intern **April - June 2023**
Physics and Mechanics of Heterogeneous Media Laboratory - PMMH (ESPCI, CNRS) *Paris, FR*

- Conducted measurements of shear-thickening suspensions using high-speed imaging and processing tools
- Analyzed transient deceleration of fumed silica flows and correlated stress with viscosity evolution
- Gained experience in experimental fluid mechanics, rheology, and data post-processing with ImageJ and Python

Awards & Distinctions

Louis Magne Scholarship – Arts et Métiers Foundation **2025**
Merit-based excellence grant awarded to top students for outstanding academic results and engagement *Paris, FR*

Technical Skills

Simulation & Analysis: CFD (StarCCM+), FEA (Abaqus, COMSOL), Modelica

CAD & Design: CATIA V5, SolidWorks, Fusion 360, Inventor

Programming: Python (NumPy, Pandas, SciPy), MATLAB

ML & Data: TensorFlow/Keras, scikit-learn

Experimental: ImageJ, High-speed imaging

Languages: French (native), English (fluent – TOEFL 98), Spanish (operational)

Leadership / Volunteering

Ambassador – Open Days at Arts et Métiers Institute of Technology **Feb. 2024 - Present**
Represented ENSAM during public outreach events *Paris, FR*

- Welcomed prospective students and their families, presenting academic programs and student projects
- Guided visitors through campus tours and shared personal experience to promote the school's engineering culture

Volunteer at GaSole (Solidarity/Ecological School Association) **Sept. 2023 – June 2024**
Participated weekly *Bordeaux, FR*

- Contributed to equal opportunities by collecting food and hygiene products and redistributing them
- Contributed to beautifying the streets of Bordeaux during weekly clean walks in the city

Quality Manager at Arts et Métiers Junior Enterprise Bordeaux (A.M.J.E Bordeaux) **Jan. – June 2024**
Managed a team of four QA Engineering Students *Bordeaux, FR*

- Developed comprehensive quality standards (ISO-9001), ensuring consistent high-quality service delivery
- Enhanced quality assurance protocols, leading to a significant improvement in client satisfaction and supervised inspection work for major clients such as Bouygues Construction

Certifications

Certified Course in Intercultural Communication **Feb. 2022**
EUGLOH, in collaboration with Paris-Saclay University *Saclay, FR*

Certified Course in Current Ecological Transition **Jan. 2022**
Paris-Saclay University *Saclay, FR*