

SIMON GARCIA SALMERON

Mechanical Engineering — Biomedical Engineering Minor | University of St. Thomas
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EDUCATION

University of St. Thomas — St. Paul, MN

Bachelor of Science in Mechanical Engineering, Minor in Biomedical Engineering | GPA: 3.5

Relevant Coursework: Fluid Mechanics, Thermodynamics, Mechanics of Materials, Dynamics & Control, Engineering Materials, Biomaterials, CAD & Solid Modeling, Experimental Methods, Statistics & Design of Experiments

Awards: International Student Scholarship, Dean's List

RESEARCH EXPERIENCE

Direct Ink Writing (DIW) Research Assistant — Lee Research Group, UST

January 2026 – Present

- Conduct response surface methodology (RSM) experiments to optimize DIW print parameters for silver-ink and PDMS-CNT-based biomedical sensors, analyzing viscosity, pressure, and print speed effects on line resolution
- Perform automated line width analysis from microscope images using adaptive Otsu thresholding and tracking-window edge detection, reducing manual measurement time by ~90%
- Developed surface roughness quantification pipeline with self-calibrating flat-field correction, enabling quantitative CV% reporting from coaxial illumination microscope images
- Built a desktop application suite (DIW Lab Suite) integrating G-Code toolpath visualization, line width analysis, and surface roughness profiling into a unified, automated workflow

PROJECTS

DIW Lab Suite — G-Code Visualization, Line Width, & Surface Roughness Analysis | Python, OpenCV, ttkbootstrap

github.com/Simon-Garcia301/Simon-Garcia301.github.io

- Engineered a modular desktop toolkit with 3 applications: G-Code to PNG converter with interactive 2D/3D toolpath preview, automated line width measurement with robust CV% (MAD), and reflectance-based surface roughness quantification with self-calibrating vignetting correction
- Implemented Engine-GUI separation architecture — computational logic runs in pure-Python engine modules independent of the Tkinter UI layer
- Packaged as standalone .exe (~85 MB) via PyInstaller for lab deployment; batch processing reduces multi-sample analysis from hours to ~15 minutes

Aerodynamic Drag Analysis: Open Windows vs. Air Conditioning | OpenFOAM, Blender, Python

simongarcia.engineer/projects/aero-drag/

- Built a 3D model of a 2020 Hyundai Santa Fe in Blender and ran 30 CFD simulations ($k-\omega$ SST model) in SimFlow/OpenFOAM across 5 velocities with open vs. closed windows
- Quantified a 3.6% increase in drag coefficient with open windows, translating to 1.57 kW of extra power demand at highway speed — confirming AC-with-windows-up is more fuel-efficient at highway speeds

Mapping the Illumination of a Desk | Python, NumPy, Matplotlib, Multivariable Calculus

simongarcia.engineer/projects/desk-illumination-mapping/

- Derived a closed-form illumination function from the inverse-square law and 3D distance geometry, then validated it against 180 real lux measurements across a study desk
- Generated heatmap visualizations confirming the critical point lies directly beneath the light source, consistent with the mathematical model's prediction

TECHNICAL SKILLS

CAD & Simulation: SolidWorks, SimScale (CFD), OpenFOAM/SimFlow, Blender

Programming: Python (NumPy, OpenCV, Matplotlib, ttkbootstrap, Pandas), MATLAB, Git

Prototyping & Lab: 3D Printing (PLA, FDM), Arduino/Raspberry Pi, Breadboarding, Microscope Imaging, DIW Setup, Rheology

Languages: English (fluent), Spanish (native)

LEADERSHIP & INVOLVEMENT

UWC Mahindra College — Pune, India | International Baccalaureate Diploma

- Graduated from a globally-selective United World College with students from 80+ countries; developed cross-cultural communication and collaboration skills

American Society of Mechanical Engineers (ASME) — UST Student Chapter, Member