

Francisco Javier Aguilar Rojas

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EDUCATION

Tecnológico de Monterrey, Mexico

August 18 – June 23

B.S. Mechanical and Electrical Engineering - GPA: 99.75/100

Valedictorian of the 125th generation of the School of Engineering and Sciences (1/5000+)

National EGEL-Ceneval Award (Top 4% of Mechanical Engineers in Mexico)

RESEARCH EXPERIENCE

Harvard Medical School – Brigham and Women's Hospital

Zhang Laboratory – Cambridge, MA, USA

External collaborator

February 23 – Present

Advisors: Yu Shrike Zhang, Ph.D. and Sushila Maharjan, Ph.D.

Research Intern

February 22 – January 23

- Developed software (graphic user interface and control) for a custom-made pressure regulator.
- Designed and fabricated the hardware and software of a top-down digital light processing bioprinter.
- Elaborated an algorithm capable of analyzing the alignment properties (orientation, distance, and width) of cells for ultrasound applications.
- Conducted computational fluid dynamics simulations to analyze the strain of organs on a chip and bioink mixing.
- Developed protocols and carried out experiments of diverse projects including bioprinting, ultrasound, and organ-on-chip.

Tecnológico de Monterrey

VantTec Laboratory – Monterrey, NL, Mexico

Advisors: Herman Castañeda, Ph.D. and Alejandro González, M.S.

Research Student

February 20 – December 21

- Implemented a Kalman filter for state estimation for autonomous underwater vehicles in Python.
- Performed a guidance law for the control of autonomous underwater vehicles using MATLAB.

Tecnológico de Monterrey

Space Makers Laboratory – Monterrey, NL, Mexico

Advisor: Paloma González, M.S.

Research Student

August 19 – December 21

- Developed a canned satellite for the prediction of weather conditions.
- Designed a printed circuit board using Proteus 8 for the control and communication for a rocket.

WORK EXPERIENCE

John Deere

Enterprise Technology & Engineering Center – San Pedro, NL, Mexico

Manager: Abraham Martínez, M.S.

Electrical Design Engineer

March 23 – Present

- Performed harness design for planters and seedings machines in CREO.
- Executed electrical circuits analysis and designed prints for electrical harnesses.

Diram

Research and Develop Center – San Pedro, NL, Mexico

Manager: Guillermo Campos, Ph.D.

Electrical Intern

August 21 – January 22

- Conducted 3D design of a structure for a harmonic power filter and performed circuit analysis.
- Carried out computational heat transfer simulations to analyze the power losses in semiconductors.

PUBLICATIONS

Weber P, Cai L, **Aguilar Rojas FJ**, Garciamendez-Mijares CE, Tirelli MC, Nalin F, Jaroszewicz J, Świąszkowski W*, Costantini M*, Zhang YS*. Microfluidic Bubble-Generator Enables Digital Light Processing 3D Printing of Porous Structures. **Aggregate**, 2023, e409. doi.org/10.1002/agt2.409

[Garciamendez-Mijares CE, **Aguilar Rojas FJ**], Hernandez P, Kuang X, Gonzalez M, Ortiz V, Riesgo R, Rendon Ruiz D, Manjarrez Rivera VA, Rodriguez JC, Ceron Castillo P, Perez A, Cruz LM, Khoon L, Zhang YS*. Design Considerations for Digital Light Processing (Bio)printers. **Applied Physics Reviews**, 2023, *in revision*.

Aguilar Rojas FJ, Garciamendez-Mijares CE, Cai L, Vejar Carrillo LE, Hernández Mendoza P, Paez Ochia D, Ceron Castillo P, Zhang YS*. Low-cost DiY DLP Top-Down Bioprinter. **International Journal of Bioprinting**, *submitted*.

[Garciamendez-Mijares CE, **Aguilar Rojas FJ**, Rendón Ruiz DS], Hernández Mendoza P, Manjarrez Rivera VA, Maharjan S, Gholizadeh S, Gerhard-Herman MD, Zhang YS*. A Pressure-Regulator Platform for Applying Biomechanical Stimuli on Organ-on-A-Chip Systems with Physiological and Pathological Relevancy. **Advanced Healthcare Materials**, 2023, *in revision*.

Weygant J, Koch F, Riesgo Galaviz RA, Entezari A, Garciamendez-Mijares CE, Hernández Mendoza P, Ortiz Padilla V, Rendón Ruiz DS, **Aguilar Rojas FJ**, Andolfi A, Maharjan S, Osorio A, Zhang YS*. Droplet 3D Cryobioprinting for Fabrication of Free-standing and Volumetric Structures. **Aggregate**, 2023, *in revision*.

CONFERENCES, FORUMS AND COMPETITIONS

McMaster University

International Design and Engineering Education Association, Forum 2023 – Hamilton, ONT, Canada

Advisors: Dan Centea, Ph.D. and Pedro Orta, M.S. | Presenter **July 23**
Automated Transshipment of Goods. *Second place*.

Massachusetts Institute of Technology

Course at MIT.nano – Cambridge, MA, USA

Advisor: Luis Velázquez, Ph.D. | Certified **July 21**
One-week hands-on introduction to microfabrication technology using the diverse toolsets of MIT.nano.

Tecnológico de Monterrey

Entrepreneur Challenge – Monterrey, NL, Mexico

Advisor: Nora Hernández, M.S. | Participant **December 20**
Low-cost ventilator for COVID-19. *Third place*.

National Autonomous University of Mexico

Ibero-American contest of canned satellites – Mexico City, Mexico

Advisor: Paloma González, M.S. | Participant **August 19 – July 20**
Canned satellite for the prediction of weather conditions. *Outstanding participation*.

HONORS & AWARDS

- Valedictorian of the 125th generation of the School of Engineering from Tecnológico de Monterrey (2023).
- Honorable Mention of Excellence from Tecnológico de Monterrey (2023).
- National EGEL-Ceneval Award (Top 4% of Mechanical Engineers in Mexico, 2023).
- “Líderes del mañana” Scholarship (2018 - 2023).
- Roberto Rocca Scholarship (2019 - 2023).
- Outstanding Engineering Student Award from Tecnológico de Monterrey (2019, 2020, 2021 and 2022).
- XLVII FRISA Award for Entrepreneurial Development (2020).
- Bronze medal at National Physics Olympics (2017).

EXTRACURRICULAR

AIIESEC México

Member of outgoing talent **February 20 – January 22**
An international youth-led, non-profit, non-governmental organization that seeks to provide youth with leadership development, cross-cultural internships, and global volunteer exchange experiences.

Excellence Academic Mentors (MAE)

Mentor **February 19 – January 22**
Non-profit team from Tecnológico de Monterrey that seeks to provide counseling of STEM topics, looking to improve student performance.

Without Fear of the Current (SMALC)

Mentor **August 19 – June 20**
Non-profit team that mentors local high school students on electronics and programming topics.

SOFTWARE AND SKILLS

Programming – C++, C, MATLAB, and Python.

Finite Element Analysis – ANSYS, Abaqus, and SolidWorks.

Fluid Dynamics – ANSYS, SolidWorks, and COMSOL.

Computer Design – SolidWorks, CREO and Fusion 360.

Fluorescent microscopy – ZEN (Blue Edition).

Fabrication – 3D printing, laser cutting and CNC.

Electronics – PCB (Proteus 8) and sensors instrumentation.

Language – Spanish (Native) and English (C1).