

Iván de Jesús Velázquez Escorcía

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EDUCATION

Tecnológico de Monterrey, México

August 21 – December 25

B.S. Nanotechnology Engineering - GPA: 95.01/100
Expected Honorable Mention

RESEARCH EXPERIENCE

Harvard Medical School – Brigham and Women's Hospital

Zhang Laboratory – Cambridge, MA, USA

External collaborator
Research Intern

February 25 – Present

Advisors: Yu Shrike Zhang, Ph.D., and Xiao Kuang, Ph.D.

February 24 – February 25

- Engineered ATPS-based hybrid hydrogels with >1 GPa modulus employing extrusion and volumetric bioprinting, enabling microstructured scaffolds for vascular tissue engineering.
- Designed polymer phase diagrams to tune scaffold porosity, stiffness, and bicontinuous morphology.
- Coaxially bioprinted ECM-based constructs for in vitro and in vivo blood vessel formation.
- Optimized RNA extraction workflow for hard tissues, increasing yield, purity, and reproducibility.
- Collaborated with Notre Dame University for the development of vascular chips employing a sacrificial bioink
- Contributed experimental data, figure preparation, and methods sections to 3+ manuscripts (Nature Protocols under review, Nat. Comm. under review).

Tecnológico de Monterrey

Nanodevices Lab – Monterrey, NL, MEX

Advisors: Sergio O. Martinez, Ph.D., and Guarav Chauhan, Ph. D.

Research Volunteer

February 25 – December 25

- Fabricated microfluidic glioblastoma-on-chip systems mimicking the blood–brain barrier for targeted nanotherapy.
- Designed and produced photolithography masks and PDMS chips using soft lithography
- Elaborated a research proposal for manuscript publication and funding justification.

Tecnológico de Monterrey

Microfluidics Lab – Monterrey, NL, MEX

Advisor: Victor H. Perez, Ph. D.

Research Volunteer

August 25 – Present

- Updated classical electrokinetic models by integrating multiple zeta potentials in low-conductivity systems.
- Designed a gut-on-chip system with peristaltic-inspired motion and ECM-like perfusion channels.

Applied Chemistry Research Center (CIQA)

Organic Chemistry Lab – Apodaca, NL, MEX

Advisor: Miguel Amado, Ph. D., Arian Espinosa-Roa

Research Intern

July 25 – September 25

- Synthesized imine-based semiconductors as photocromic sensors for heavy-metal detection from recycled batteries.
- Modeled optical transitions using computational chemistry to predict absorption spectra.

Advanced Materials Research Center (CIMAV)

Nanostructures and Polymers Lab – Apodaca, NL, MEX

Advisor: Lourdes Ramos, Ph. D.

Research Intern

June 25 – August 25

- Developed microencapsulated phase change materials enhanced with graphene oxide, improving encapsulation efficiency by 10% in epoxy resins.

Applied Nanotechnology Institute/ Spintronics

Nanomaterials Lab – Tultepec, Edo. Mex., MEX

Advisor: Yosemite Arjuna, Ph.D., Edith Bravo Ph.D.

Research & Collaborator

January 23 – December 23

- Developed and synthesized ZnO QDs for the controlled delivery of ibuprofen via colloidal solution and a PEGylation functionalization

Tecnológico de Monterrey

MARTEC – Monterrey, NL, MEX

Advisor: Eduardo Sosa, Ph.D., & Alberto Aguayo, Ph.D.

Research Intern

June 23 – January 24

- Synthesized chitosan-based hydrogels with metallic nanoparticles for Influenza A genetic material adsorption

PUBLICATIONS

X. Kuang, **I. V. Escorcía**, S.G. Favela, R. R. Vidal, D. A. Betancourth Castellanos, M. O. Arican, S. Maharjan, Y. S. Zhang, Aqueous Two-Phase Emulsions Enabled (Bio)printing for Microstructured Tissue Scaffolds. (*Nature Protocol*, Under Review)

X. Kuang, **I.V. Escorcía**, R. R. Vidal, S. Maharjan, and Y. S. Zhang, Bi-continuous Hybrid Hydrogels for (Bio)printing Tough and Bioactive Engineered Vessels. (*Nature Communications*, Under Review)

X. Kuang, **I.V. Escorcía**, R. R. Vidal, M. O. Arican, M. Wang, S. Maharjan, E. Peña Jimenez, Y. Wu, and Y. S. Zhang, Elastin-Gelatin Copolymer-based Tough Porous Hydrogels for Bioprinting of Functional Blood Vessels. (*iScience*, Invited, In preparation)

Xiao Kuang, Yujun Shen, Shivani Samir Tuli, **I. V. Escorcía**, E. Peña Jimenez, Y. Shrike Zhang, Advances in Vascular Bioprinting: Methodologies, Materials, and Applications. (*ACS Biomaterials Science & Engineering*, In preparation)

Salvador Gallegos-Martinez, Pauline Maciel-August, Jolie Cabrera, Rodrigo A. Arredondo-Garza1, **I.V. Escorcía**, Mariana Lemos-Duarte, Zhangying Chen, Fanny M. Elahi & Yu Shrike Zhang, Coaxial bioprinting of vascular conduits for modeling cerebral autosomal dominant arteriopathy with Subcortical Infarcts and Leukoencephalopathy (CADASIL). (In preparation)

CONFERENCES & PRESENTATIONS

Rice University - GCURS

Gulf Coast Undergraduate Research Symposium – Houston, TX, USA

Advisors: Y. Zhang Ph.D., X. Kuang Ph.D., S. Gallegos Ph.D. | Certified

October 25

“Aqueous Two-Phase Emulsion-Based Micropore Bioprinting of Vascular Tissues”, Bioengineering Division.

Institute of Innovation and Technology Transfer (I2T2)

Summer Poster Presentation – Apodaca, NL, MEX

Advisor: Miguel Amado Ph. D.

| Certified

August 25

“Organic imine photocromic sensors for metal detection in black mass”. *Outstanding Participation*

Advanced Materials Research Center (CIMAV)

Summer Poster Presentation – Apodaca, NL, MEX

Advisor: Lourdes Ramos, Ph. D.

| Certified

July 25

“Micro-Encapsulated Phase Change Materials with graphene oxide for thermal energy storage”. *Runner Up*

Tecnológico de Monterrey

Expo - Engineering – Monterrey, NL, Mexico

Advisor: Luz María Martínez, Ph. D.

| Certified

June 25

“Savora: Sargassum and Corn stubble biofilms for liquid encapsulation”. *Social Impact*.

Massachusetts Institute of Technology

Microfabrication Training @ MIT.nano Cleanrooms – Cambridge, MA, USA

Advisor: Luis Velázquez, Ph.D., Arnoldo Salazar, Ph. D.

| Certified

May 24 - June 24

- Gained hands-on experience in micro- and nanofabrication, producing solar panels, microfluidic devices, and cantilevers.

- Applied advanced cleanroom techniques, including sputtering, chemical vapor deposition (CVD), spin-coating, etching, and photolithography.

Mexican Society of Materials

UAEH & UPVM, poster presentation – Hidalgo & Valle de México, Mexico

Advisor: Yosemite Arjuna, Edith Bravo

| Participant

September & October 23

“ZnO QDs for controlled-release drug delivery of ibuprofen”. *1st and 2nd place.*

HONORS & AWARDS

- Excellence Academic Scholarship (2021-2025)

EXTRACURRICULAR

Nanotechnology Engineering Ambassador

| Speaker & Presenter

January 25 – Present

Deliver engaging talks and presentations to incoming students and the general public, promoting nanotechnology and its applications to inspire future engineers.

STEM Talks

| Speaker

March 25

Selected as 1 of only 5 distinguished speakers to represent the entire School of Engineering and Sciences at Tecnológico de Monterrey in a **TEDx-style talk** attended by over **300 attendees**, delivering a compelling call to action for students to pursue careers in STEM fields.

Research TEC

| President

September 23 – January 24

Founded and led an undergraduate research group, mentoring 20+ students on nanotechnology prototypes, proposal writing, and review paper development.

SOFTWARE AND SKILLS

Programming – MATLAB, and Python.

Characterization – SEM, XRD, FTIR, DSC, NMR, TEM

Modeling & Simulation – ANSYS, Fusion 360, COMSOL

Statistics & Data Analysis – Minitab, OriginLab,

Excel, ImageJ, ZEN Blue

Computational Chemistry – Orca, Avogadro, ChemSketch

Biology Techniques – Cell Culture, Immunostaining, RT qPCR, ELISA

Language – Spanish (Native) and English (C1)