# Alfredo Costilla Reyes, Ph.D.


## CONTACT INFORMATION

4461 Tucker Dr. Folsom, CA 95630-6031

Phone: +1 (979) 985 1351
E-mail: alfredo.costilla.reyes@gmail.com


*Permanent resident.*

## APPOINTMENTS

**2025 – present** Lecturer, ENG 108 – Launching a Company
Student Startup Center, **University of California, Davis**.
At UC Davis, I teach and develop the curriculum for ENG 108 – Launching a Company, focusing on startup formation, customer discovery, and the Lean Startup methodology. As part of this role, I mentor interdisciplinary student teams as they progress through the entrepreneurial process, from idea validation to venture launch. I also contribute to the UC Davis Certificate in Entrepreneurship program by helping students apply practical skills to real-world startup development.

**2022 – present** Principal Investigator. AI POW LLC.
Co-founded AutoEdge to help small and medium manufacturers quickly detect defects in their manufacturing process with an intuitive anomaly detection system. Two key technological advantages of AutoEdge, born at Rice University's Computer Science program, are its Machine Learning Automation engine and its Explainable AI features, allowing domain experts to reduce bottlenecks and create reliable products that meet their quality assurance standards.

- 2024 Secured funding from the National Science Foundation (NSF) SBIR Phase **II** ($1,000,000)
  NSF Award #2335642
- 2022 Secured funding from the National Science Foundation (NSF) SBIR Phase I ($275,888)
  NSF Award #2136679
- 2022 Successfully raised a pre-seed round from Venture Capital.

**2020-2022** Postdoctoral Entrepreneur at the Department of Computer Science at **Rice University**. DATA Lab.
PI: Xia (Ben) Hu, PhD.
Two-year fellowship designed to allow scientists to transform their technology (outlier detection, computer vision and object identification, edge-AI, and explainable AI) into valuable products.

**2021-2022** Entrepreneurship Instructor at Universidad Autónoma del Estado de México.
I introduced a course project based on the Lean Startup Methodology, where students developed business models to address specific challenges in their local communities.

## EDUCATION

**2020** PhD in Electrical Engineering.
**CeDiD: 20A8-R3OF-ADSM** | https://u.tamu.edu/CeDiploma-Validation
Texas A&M University, Dwight Look College of Engineering, College Station Texas.
Advisor: Edgar Sanchez-Sinencio, Ph.D.
*Dissertation title: Energy Harvesting Systems for the Internet of Things and its Applications to Smart Agriculture.*

**2020** Graduate Certificate in Entrepreneurship and Technology Commercialization.
Texas A&M University, Mays Business School, College Station Texas.

**2016** Certificate in Business for Graduate Students.
Texas A&M University, Mays Business School, College Station Texas.

**2010** Bachelor's degree in Electronics Engineering, Class 2010 valedictorian.
Universidad Autónoma del Estado de México (UAEMéx), College of Engineering, Toluca, Mexico.

## COURSES TAKEN AT TEXAS A&M UNIVERSITY

**Courses at Texas A&M – College of Engineering:** Digital Integrated Circuit Design, Solid State Devices, Microprogammed Control of Digital Systems, Switching Power Supplies, Advanced Analog Circuit Design Techniques, Low-noise Electronic Design, Active Network Synthesis, Testing and Diagnosis of Digital Systems, Intro to Hardware verification, Electronic Motor Drives, Harnessing Solar Energy: Optics, Photovoltaics and Thermal Systems.

**Courses at Texas A&M – Mays Business School:** Accounting, Finance, Marketing, Management, Technology Commercialization, Fundamentals of Entrepreneurship, Managing Projects, Negotiations in Competitive Environments.

## RESEARCH INTERESTS

Computer vision in manufacturing. Watermarking techniques for digital asset protection. Machine learning at the Edge. Large Language Models. Entrepreneurship.

## PUBLICATIONS

**Journals**

**2019** A. Abuellil, J. J. Estrada López, A. Vighnesh, **A. Costilla-Reyes**, Z. Zeng and E. Sánchez-Sinencio, "Multiple-Input Harvesting PMU with Enhanced Boosting Scheme for IoT Applications," in IEEE Transactions in Industrial Electronics.

**2019** J. J. Estrada Lopez, A. Abuellil, **A. Costilla-Reyes**, M. Abouzied, S. Yoon and E. Sanchez-Sinencio, "A Fully Integrated Maximum Power Tracking Combiner for Energy Harvesting IoT Applications," in IEEE Transactions on Industrial Electronics.

**2018** **Alfredo Costilla-Reyes**, Amr Abuellil, Johan J. Estrada-López, Salvador Carreon-Bautista and E. Sánchez-Sinencio, "Reconfigurable Front-End for Electromagnetic Energy Harvesting Rectification and Activity Sensing for Wearable Technology," in IEEE Transactions on Circuits and Systems II: Express Briefs.

**2018** **Alfredo Costilla-Reyes**, Celal Erbay, Salvador Carreon-Bautista, Arum Han, and Edgar Sánchez-Sinencio. "A Time-Interleave-Based Power Management System with Maximum Power Extraction and Health Protection Algorithm for Multiple Microbial Fuel Cells for Internet of Things Smart Nodes." Applied Sciences 8, no. 12 (2018): 2404.

**2015** J. Zarate-Roldan, S. Carreon-Bautista, **A. Costilla-Reyes** and E. Sánchez-Sinencio, "A Power Management Unit With 40 dB Switching-Noise-Suppression for a Thermal Harvesting Array," in IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 62, no. 8, pp. 1918-1928, Aug. 2015.

## Conferences

**2023** Chuang YN, Wang G, Chang CY, Lai KH, Zha D, Tang R, Yang F, Reyes AC, Zhou K, Jiang X, Hu X. DiscoverPath: A Knowledge Refinement and Retrieval System for Interdisciplinarity on Biomedical Research. InProceedings of the 32nd ACM International Conference on Information and Knowledge Management 2023 Oct 21 (pp. 5021-5025).

**This Work Received CIKM 2023 Best Demo Paper Honorable Mention.**

**2023** Lian AT, Costilla Reyes A, Hu X. CAPTAIN: An AI-Based Chatbot for Cyberbullying Prevention and Intervention. InInternational Conference on Human-Computer Interaction 2023 Jul 9 (pp. 98-107). Cham: Springer Nature Switzerland.

**2022** Wang G, Bhat ZP, Jiang Z, Chen YW, Zha D, Reyes AC, Niktash A, Ulkar G, Okman E, Cai X, Hu X. Bed: A real-time object detection system for edge devices. In Proceedings of the 31st ACM International Conference on Information & Knowledge Management 2022 Oct 17 (pp. 4994-4998).

**This Work Received CIKM 2022 Best Paper Award.**

**2021** Zha D, Bhat ZP, Chen YW, Wang Y, Ding S, Chen J, Lai KH, Bhat MQ, Jain AK, Reyes AC, Zou N. Autovideo: An automated video action recognition system. arXiv preprint arXiv:2108.04212. 2021 Aug 9.

**2018** J. J. Estrada-López, A. Abuellil, **A. Costilla-Reyes** and E. Sánchez-Sinencio, "Technology Enabling Circuits and Systems for the Intemet-of-Things: An Overview," 2018 IEEE International Symposium on Circuits and Systems (ISCAS), Florence, Italy, 2018, pp. 1-5.

**2014** J. Zarate-Roldan, S. Carreon-Bautista, **A. Costilla-Reyes** and E. Sanchez-Sinencio, "An ultra-low power power management unit with −40dB switching-noise-suppression for a 3×3 thermoelectric generator array with 57% maximum end-to-end efficiency," Proceedings of the IEEE 2014 Custom Integrated Circuits Conference, San Jose, CA, 2014, pp. 1-4.

## Poster/Oral presentations

**2018** **Alfredo Costilla-Reyes** and Edgar Sánchez-Sinencio PhD, "showcase pitch of BitGrange and Blackstone Launchpad at Texas A&M University a campus-based program designed to assist and mentor students about entrepreneurship opportunities at Texas A&M University," South By Southwest® Edu (SXSW® edu), Austin, USA, 2018.

**2017** **Alfredo Costilla-Reyes** and Edgar Sánchez-Sinencio PhD, "Educative platform for indoors vegetable production based on the Internet of Things," Second International Forum of Mexican Talent INNOVATION MATCH MX. Mexico City, Mexico, June 2017.

**2017** **Alfredo Costilla-Reyes**, Grace Fan and Edgar Sánchez-Sinencio PhD, "BitGrange: development of a smart hydroponics device to grow vegetables indoors," Texas A&M University College of Engineering's National Labs Day. College Station, USA, 2017.

**2015** **Alfredo Costilla-Reyes**, Johan Jair Estrada-López, Edgar Sanchez-Sinencio PhD. "Energy Harvesting Applications for Building Automation". The 52nd Annual Technical Meeting, The Society of Engineering Science. College Station, TX, 2015.

**Intellectual Property**

Empresopía soft- program of collection of tasks and administration of personnel in real time. Reg. # 03-2012-071109304100-01, INDAUTOR, Mexico.

## COMPETITIONS, AWARDS AND HONORS

**2025** Rice Business Plan Competition – Finalist | mentored team Watermarked.ai, focused on developing technologies for digital IP protection (music).

**2021** Rice Business Plan Competition – Finalist | AIPow: technology commercialization of machine learning automation technologies developed during postdoctoral work.

**2020** Silicon Labs Fellowship | Award given to support project on clean energy and future of wearables.

**2019** Selected to participate at YC-120 | Conference organized by YCombinator to bring together curious, creative people who are doing exciting work in emerging fields.

**2019** Raymond Ideas Challenge - Honorific Mention | in recognition for technology commercialization of doctoral research.

**2019** McFerrin Fellowship | Recognition given to support students at Texas A&M University with remarkable entrepreneurial track record.

**2019** One of 28 students selected to participate in the Silicon Valley Bank Trek 2019 – a series of events that brings together today's leaders and innovators. This event will take place on January 2-6, 2019 in Silicon Valley, California.

**2018** Top ten Finalist Patagonia® Business Case competition | This case study focused on Patagonia's® goal of reaching carbon neutrality by 2025 | Event hosted by the University of California Berkeley's Walter A. Haas School of Business. | On the news: www.tx.ag/ebQzfak

**2018** Speaker at South By Southwest® Edu (SXSW® edu) | The SXSW EDU Conference & Festival cultivates and empowers a community of engaged stakeholders to advance teaching and learning | This invitation is to give a showcase pitch of BitGrange and Blackstone Launchpad at Texas A&M University a campus-based program designed to assist and mentor students about entrepreneurship opportunities at Texas A&M University.

**2018** Finalist Casa Mexico South By Southwest® (SXSW®) Business Competition | South by Southwest® (SXSW®) Conference & Festivals celebrate the convergence of the interactive, film, and music industries, Austin, TX | Casa México SXSW is an initiative launched by the Mexican government in 2016 with the mission of generating an effective platform for Mexican entrepreneurs to take advantage of the opportunities offered by the SXSW Festival.

**2018** Worldwide recognized as one of 16 Young Entrepreneurs Revolutionizing Food and Farming | non-for-profit organization FoodTank | highlight of 16 young food and farming entrepreneurs who have transformed their love for food, farming, and sustainability into tools to build a stronger and more equitable food system | On the news: www.tx.ag/ClBnOav

**2017** One of five startups selected to present at Massachusetts Institute of Technology - Harvard University Entrepreneurship forum hosted at Sloan Business School | Boston Massachusetts, USA, November 2017 | Full travel expenses covered.

**2017** **Mexico National Youth Prize** | Award given in recognition of my dissertation work in urban agriculture | Highest honor given by the Mexico President to the country's youth recognizing my contributions in agriculture, technology and entrepreneurship | Texas A&M story at: www.tx.ag/Pmgkyod

- Mexico National Youth Award congratulatory meeting with Former president of Mexico, Vicente Fox. Organized by Fox Center, Guanajuato Mexico, November 2017.
- Distinguished state citizen acknowledgement given by the Governor of the State of Mexico, Mexico. Full travel expenses covered + certificate signed by governor. December 2017.
- Distinguished alumni acknowledgment given by the President of the Autonomous University of the State of Mexico (undergrad school). November 2017.
- Video recognizing work contributions | Dwight Look College of Engineering | Most watched video of 2017 | Watch clip at: www.tx.ag/UXe53Jt

**2017** Kirchner Food Award | The purpose of the Kirchner Food program is to foster the development of individuals who have the practical skills and knowledge to make effective investments in emerging agricultural technologies that have the possibility of addressing global food security | Awarded by Kirchner Group Foundation | Texas A&M Story at: www.tx.ag/8WsYtDW | Official page at: www.tx.ag/XhyCx6j

**2017** Selected participant in the iSITE program | Dwight Look College of Engineering, Texas A&M University | This National Science Foundation-funded program is aimed to help students develop a business using the lean startup model by adopting a combination of business-hypothesis-driven experimentation, iterative product releases and validated learning

- Attended 3D startup Global Roundup in Austin Texas. July 2017. As part of the NSF I Site program.

**2017** Invited to present *Urban Farming* dissertation project at Thought For Food Global Summit in Amsterdam, Netherlands. Summer 2017. Awarded by Thought For Food foundation and Texas A&M College of Agriculture and Life Sciences

**2017** TigerLaunch business competition | Princeton Entrepreneurship Club at Princeton University | Regional finalist of the nation's largest student-run inter-collegiate entrepreneurship competition.

**2017** 1st place winner in agriculture-related business competition Grand Challenges Challenge Competition | award given by the College of Agriculture and Life Sciences at Texas A&M University.

**2016** 2nd place U-Ignite competition | Dwight Look College of Engineering, Texas A&M University | Initiative for students to showcase their creative ideas to improve the world.

**2015** Participant of the Fall 2015 3 Day Startup by CNVE Texas A&M | Pitch a start-up to potential investors | Work with a team to create a viable business plan in the span of three days.

**2014** International postgraduate scholarship – Awarded by the Department for public education (SEP, Mexico)

**2013** Texas Instruments one-time scholarship | Awarded by the Department of Electrical and Computer Engineering at Texas A&M University.

**Fall 2013 – Summer 2018** Scholarship to fund five years of the direct-PhD studies | Five-year funding | Awarded by Mexico's National Council for Science and Technology.

## ON THE NEWS

**2018** Texas A&M Foundation, Spirit Magazine. Article: Lab Work: Research Developments – Electrifying Agriculture. URL: www.tx.ag/JBdhzlV

**2018** Insite Magazine. Article: BitGrange: The Future of Farming? URL: https://insitebrazosvalley.com/arts-culture/bitgrange-future-farming/

**2017** Video recognizing work contributions | Dwight Look College of Engineering | Most watched video of year 2017 | Watch clip at: www.tx.ag/UXe53Jt

**2017** Texas A&M University's The Battalion. Article: National Entrepreneur, internationally recognized: Texas A&M Ph.D. candidate receives highest youth award given in Mexico. URL: https://engineering.tamu.edu/news/2017/11/costilla-reyes-awarded-mexicos-highest-student-award.html

## GRANTS

**2024** Small Business Innovation Research Phase II grant. Secured $1,000,000 in funding from the National Science Foundation. NSF Award #2335642 - A Hardware-Aware AutoML Platform for Resource-Constrained Devices.

**2024** I-CORPS program. $50,000 in funding for customer discovery from the National Science Foundation. The I-CORPS program was completed in May 2024.

**2022** Small Business Innovation Research Phase I grant. Secured $275,888 in funding from the National Science Foundation Award #2136679

**2018** Travel Grant to attend the Mexico AgTech competition | Grant awarded by the Electrical and Computer Engineering Department at Texas A&M University. May 2019.

**2019** Entrepreneurial Experiences Fund | Travel grant to attend Silicon Valley Bank Trek 2019 | Provided by the McFerrin Center for Entrepreneurship to help enable and encourage student experiences that enhance entrepreneurial learning and connections**.**

**2018** Travel grant to attend Thought For Food Global Summit in agriculture and entrepreneurship | Rio de Janeiro, Brazil | Grant awarded by Kirchner Group. July 2018.

**2018** Travel grant to visit Noble Research Institute as part of the Kirchner Food Fellowship training on impact investment in sustainable agriculture | Oklahoma, USA | Grant awarded by Kirchner Group. February 2018.

**2018** Travel Grant to attend the finals of the Patagonia competition with the topic "IoT and Blockchain for advanced agricultural traceability" presented at University of California – Berkeley Walter A. Haas School of Business, USA. | Grant awarded by the Electrical and Computer Engineering Department at Texas A&M University. April 2018.

**2017** Travel Grant to attend the conference #RealCollege: A National Convening on College Food & Housing Insecurity | Philadelphia, USA | Grant awarded by Thought For Food foundation. October 2017.

**2017** Travel grant to visit the accelerator Agrobiotec, expo Agroalimentaria and Hacienda Sta. Clara as part of the Kirchner Food Fellowship training on impact investment in sustainable agriculture | Guanajuato, Mexico | Grant awarded by Kirchner Group. November 2017.

**2016** Lean Startup Summer Program | Selected with the project to develop a business using the lean startup model by adopting a combination of business-hypothesis-driven experimentation, iterative product releases and validated learning | Awarded by Dwight Look College of Engineering and Startup Aggieland, Texas A&M University.

## ENTREPRENEURSHIP ACTIVITIES

**2021** SEAL program at UT-Austin. Series of talks in multiple non-dilutive grant opportunities for startups

**2020** OwlSpark program at Rice University. Summer program that emphasized entrepreneurial networking, customer discovery work and world-class entrepreneurial education.

**2017** Ambassador at Aggies for Global Food Security. Initiative by the College of Agriculture and Life Science.

**2017** Mentor at 3D Startup at Texas A&M University | Event organized by Startup Aggieland the Texas A&M on-campus incubator and accelerator.

**2017** Speaker at Aggie 100. Presented a brief story about BitGrange and my experience at Startup Aggieland.

**2017** Mentor at Aggies Invent | Entrepreneurial event organized by the Dwight Look College of Engineering at Texas A&M University.

## ACADEMIC ENTREPRENEURSHIP EXPERIENCE

**2017-2020** Self-powered wearable technology based on energy harvesting.

- Led a team of doctorate students and industry partners to develop an energy harvesting system to extend the battery life of a fitness tracker.
- An embedded system was developed, fabricated and tested which involved the design of an integrated circuit for AC-DC rectification and sensing capabilities and an on-board system for DC-DC conversion
- The results of this research were successfully published (see journals: IEEE Transactions on Circuits and Systems II: Express Briefs)
- This project was awarded with an honorific mention at Texas A&M's Raymond Ideas Challenge business competition and top 10 innovative ideas at the Aggie Pitch business competition.

**2015-2020** BitGrange: IoT-based urban farming

- Led a team of graduate and undergrad students in our endeavor to build the tools to educate the next generation of farmers
- Different prototypes were designed, fabricated and tested that involved 3D design and printing, embedded system design to integrate sensors and LED technology to successfully grow plants inside a classroom
- This project was recognized as Worldwide recognized as one of 16 Young Entrepreneurs Revolutionizing Food and Farming www.tx.ag/ClBnOav

## Research

**2016** Research Stay | Location: Universidad Autónoma del Estado de México, Toluca, Mexico | Topic: Design and development of a 3D model of a portable device to allocate an electromagnetic transducer and a circuit for energy conversion.

**2016** Research Stay | Location: Universidad Autónoma del Estado de México, Toluca, Mexico | Topic: Design and development of a 3D model of a device to grow plants for indoors usage based on Internet of Things.

**2010** International Research Stay | Project title: "Design considerations at higher level for a Super-Regenerative Receiver". | Universidad Texas A&M, Estados Unidos de Norteamérica, Analog and Mixed Signal Center. | Tutor: PhD. Edgar Sanchez-Sinencio.

**2009** Student researcher program | Project title: Estudio de interfaces para controlar sistemas robóticos tele-operados con alto grado de tele presencia (Translation into English: *study of interface to control tele-operated robotic systems with high degree of tele-presence*) | College of Engineering UAEMéx (CONACyT project) | Advisor: PhD. Otniel Portillo Rodríguez, UAEMéx researcher.

**2008** Alumno Investigador (Researcher Undergrad Student) | Project title: Evaluación de la infiltración de aguas residuales y su efecto sobre la calidad del agua (Translation into English: *evaluation of residual water leakage and its effects in the water quality*) | Research Center For Water Resources Studies | Advisor: Dr. Javier Salas García, UAEMéx researcher.

## Mentoring

**2020 – 2024** Graduate Student Research Program at Rice University. Mentored a total of 11 graduate students in research activities in the DataLab laboratory.

**2017 – 2018** Aggie Research Program at Texas A&M University. Mentored a total of 18 undergraduate students in research activities in my laboratory.

**RESEARCH REVIEW**

**2017 - 2020** Reviewer for IEEE Transactions on Industrial Electronics (TIE) Journal.
**2017 - 2020** Reviewer for Transactions on Circuits and Systems I: Regular Papers (TCAS-I) Journal.

**LEADERSHIP EXPERIENCE**

**2023** Organizing chair at the 11th IEEE International Conference on Healthcare Informatics. The premier forum for advances in healthcare informatics

**2017 – 2018** Ambassador at Aggies For Global Food Security, an initiative by the College of Agriculture and Life Sciences at Texas A&M University.

**2009-2011** Council Member of the school of engineering- electrical and electronics department, UAEM, Mexico. Managed student affairs at the school of electrical and electronics department.

**2009-2011** Council Member of Plantel 5, UAEM, Mexico.

Managed student affairs at the school of electrical and electronics department.

## PRESENTATIONS

**2021** Lab for Innovation and Entrepreneurship at Rice University.
*Entrepreneurship, computer science, and entrepreneurship.*

**2018** Blinn College, Texas, USA.
*Title: Technology and entrepreneurship on future agriculture.*

**2017** Aggies For Global Food Security.
*Title: internet technologies, the impact in global food security and current opportunities.*

## SCIENCE VOLUNTEERING AND OUTREACH

**2018** Aggieland Saturday 2018, Research, Technology and Entrepreneurship: Electrical Engineering as a Tool to Serve Others.

**2014** Dwight look College of Engineering. Hands on workshop on Energy Harvesting principles.

## COMPUTER SKILLS

**Packages & Softwares:** Profound knowledge of: Microsoft Poject Cadence, Caliber, LTpice, MATLAB, Altium, Solidworks.
**Hardware design platforms:** Profound knowledge of: Xilinx ISE Design Suite Verilog, Microprocessors and Microcontrollers.
**Programming Languages:** Profound knowledge of: Python, MATLAB, C++, Visual BASIC.

## LANGUAGE

**Spanish**: Native Speaker.
**English**: Advanced.
**Chinese**: Basic.

## HOBBIES

Public speaking. Hiking.

## REFERENCES

**Dr. Xia (Ben) Hu**
Rice University, Professor in Computer Science
E-mail: xia.hu@rice.edu

**Hua Xu, PhD**
Yale University, New Haven, CT, USA
E-mail: Hua.Xu@yale.edu

**Kim Dooley, PhD**
Texas A&M University, Professor and Associate Dean at the College of Agriculture and Life Sciences
E-mail: k-dooley@tamu.edu

**Ruixiang Tang, PhD**
Rutgers University, New Jersey, USA
ruixiang.tang@rutgers.edu

**Xiaoqian Jiang, PhD**
University of Texas Health Science Center at Houston, Houston, TX, USA
E-mail: Xiaoqian.Jiang@uth.tmc.edu

**Ninghao Liu, PhD**
University of Georgia, Athens, GA, USA
E-mail: ninghao.liu@uga.edu