Research at UPAEP

October 2023

UPAEP The Transformative University

UPAEP

Research at UPAEP

I. **Researchers recognized by the National Science and Technology Council** (Conahcyt, acronym in Spanish)

- **99 researchers** recognized in the Conahcyt in **2023**.
- UPAEP is positioned as the **sixth** private university with the **highest number of researchers in Mexico**.
- In **Puebla**, we **are the third university** with the highest number of researchers with distinction, and we are the **third** in number of National System of Researchers (SNII, acronym in Spanish) as a **Catholic university at the** national level.

II. **Collegiate research groups**

- **5** Research Centers.
- **4** Study Centers.
- **19** collegiate research groups.

III. **Research projects:**

With external financing:

Historically, **38** research projects were funded by different entities, such as Conahcyt, Concytep, Oxford University, and Sacred Heart University, totaling approximately **131 million pesos (**2001- 2023).

Outstanding lines of research:

Among the outstanding research lines, we have research projects with social impact, such as:

- Line: Environment and sustainability
  - Analysis and treatment of **contaminated soils.**
  - **Water** analysis and treatment**.**
  - Waste treatment to reduce **pollution** and generate **reusable by-products,** including **biofuels**.
  - Use of **renewable energies.**
  - **Energy** recovery and conversion**.**
- Line: Health
  - Studies on **childhood cancer,** particularly **leukemia**.
  - **Breast cancer**.
  - Impact of **Covid-19** in different populations and from different perspectives.
  - **Health-promoting** effects of **food and beverages,** including in the treatment of diseases.
- Line: Education
  - **Inclusion** in education.
  - **Faculty** professionalization.
  - **Socio-affective processes** in the university environment.
- Line: Competitiveness
  - Innovation in the **tourism sector.**
  - **Migration**
  - **Social** mobility
  - Supply chain
- Line: Innovation and technology
  - **Nanosatellites**

- **Biomedical** applications
- Energy **conversion**
- Industry **4.0**
- **Data** science

- Line: Family
  - **Family** thermometer **in Mexico**.
  - Oramata Series: **Family, education, affectivity.**
  - Report on the **evolution** of the **family in Ibero-America**.

IV. Patents

We have **18 granted patents** in our inventory and **13 more filed** and in the process of examination.

V. General publications

In the last **5 years,** we have **published 918 articles** in scientific journals and **154 books** in prestigious publishing houses.

VI. About supports:

UPAEP has a system for the **promotion of research** and development of **scientific vocations** aimed at the academic community.

- For research professors
  - Research funds to **finance the development of research projects**.
  - Funds for the **publication and dissemination** of project results: a) Editorial, b) for the presentation of results in congresses and scientific journals.
  - Incentive to **research.**
- For students:
  - Research scholarship program for undergraduate and graduate students.
  - ExpoSciences

VII. Vision 2033 and research benchmarks at UPAEP

- **Serious and rigorous** thinking.
- **Creative and innovative** thinking.
- Thinking with **educational impact.**
- **Relevant** thinking.
- Thought rooted in **Catholic identity.**

Annex: Relevant information

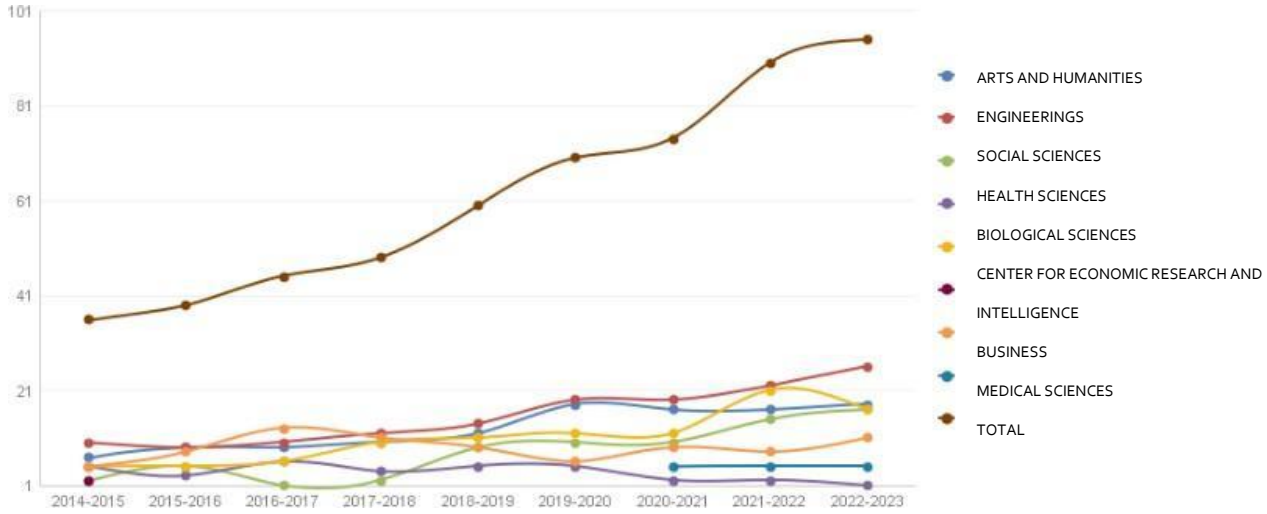
A. Members recognized by Conahcyt

Area	Candidate	Level 1	Level 2	Level 3	Total	Lines
Physics-mathematics and earth sciences	1	5			6	Semiconductors, optics, mathematics.
Biology and Chemistry	5	4			9	Biotechnology, microbiology, neurosciences, physiology.
Medicine and health sciences	1	3	1	1	6	Hematology, molecular diagnostics, microbiological sciences, immunology, cancer.
Behavioral	4	1			5	Neuropsychology, learning,

sciences and education						pedagogical methods.
Humanities	1	13	4		18	Specialized history, literary analysis, pedagogical methods, philosophical systems, and family.
Social sciences	6	23	5		34	International policy, marketing and advertising, wellbeing, clusters.
Agricultural sciences	1	4			5	Agricultural sciences, food technology, veterinary diseases.
Engineering and technological development	2	12	1		15	Power electronics, bioremediation and functional foods, artificial intelligence, and alternative energies.
Interdisciplinary	1				1	Cultural studies.
	22	65	11	1	99	

(Source: List of beneficiaries 2023, SNII, Conahcyt)

Increase in the number of researchers with SNII distinction at UPAEP.



B. 5 Collegiate research groups

1. Native Plant Research Center

Director: José Terrones Salgado

The oldest research center at UPAEP, **CIPNA, was created in 1995** due to the initiative and work of Michal W. Borys and Ms. Helena Leszczynska Borys.

Research includes ecological and conservation aspects, as well as aspects related to **agricultural production**, including **genetic improvement.**

In general, the aim is to take advantage of native resources in a more sustainable way: Echeveria gibbiflora, E. pallida, E. pumila, Sprekelia formosissima, Tigridia spp, Milla biflora, Hymenocallis spp, Zephyranthes spp, among others.

One of CIPNA's most significant achievements is that in **2011, SAGARPA granted UPAEP the Breeder's Title for the "Helena" variety of Echeveria gibbiflora, which** recognizes our university as a breeder institution and grants it the right to use and exploit it for a definite period. Through CIPNA, UPAEP has **four plant breeder titles** for ornamental varieties granted by the Mexican government.

2. "Una Nueva Esperanza" Oncology Research Center - UPAEP

Director: María del Rocío Baños Lara

In Mexico, cancer is the second leading cause of death in pediatric patients.

In **May 2015,** "Una Nueva Esperanza" and UPAEP created the Oncology Research Center (CIO, acronym in Spanish) to carry out research on cancer in children mainly, and that in the long term it can improve and raise the life expectancy of children.

In 2023, the collaboration with researchers from IMSS and INMEGEN was consolidated, which will allow the construction of the database and biobank of childhood leukemias in Puebla, Tlaxcala, and Oaxaca.

3. Electric Power and Clean Energy Research Center

Director: Edgar Peralta Sánchez

The laboratory began activities in **2012** to generate and transfer knowledge and state-of-the-art technological development in the areas of **power electronics, electric machines, electric and hybrid vehicles, renewable energies, and efficient use of energy** to contribute to the solution of regional, national, and international problems, as well as to the training of highly specialized human resources in these areas.

Among the main projects developed are the following:

Energy Saving System for Mexico City Subway trains.

The objective of this project is the efficient use of electrical energy in Mexico City's subway through the development of an energy-saving system based on supercapacitors. **The system is capable of storing the energy regenerated by the trains during the electric braking stage** to return it to the guide bar later when the trains are in an acceleration stage, this last stage when the trains present the highest energy consumption. The Fondo Mixto Conahcyt-Gobierno del Distrito Federal financed this project.

Power inverter network for energy recovery in Mexico City's subway

The objective of this project is **to save electrical energy in Mexico City's subway** through the design and implementation of a network of power inverters interconnected to the electrical grid. The prototype can take the energy regenerated during the electrical braking of the trains for immediate use in the AC electrical distribution network used for lighting and power circuits in the facilities of the public transport system.

This project is being carried out within the framework of the call for scientific, technological and/or innovation projects of the Education, Science, Technology, and Innovation Secretariat of Mexico City.

Potential energy accumulator

The main objective of this project was the implementation of a potential energy accumulator system, which stores the energy generated in excess by a photovoltaic system to be used when there is not enough solar energy to power a house. The project was executed within the PROINNOVA-2015 modality of Conahcyt.

4. Institute for the Promotion of the Common Good (IPBC, acronym in Spanish)

Director: Matthias Nebel

It was established as an organization that focuses on research, reflection, and dissemination of research on topics related to the **general wellbeing of our society**. The institute

fosters the mission of creating currents of thought and educating leaders that transform society in the search for truth, integrating faith, science, and life.

Research activities

The IPBC enables the education of groups of researchers willing to **explore specific aspects of the common good**. It organizes professional meetings, specialized conferences, and conversations at national and international levels. In 2022, we have 9 lines of research and more than 60 affiliated researchers.

Broadcast

The IPBC organizes specialized courses and training. **It publishes reports and analyses**, as well as the various products coming from the research areas (books and scientific articles). Since **2022, the IPBC has published the journal "Ethics, Economics and Common Goods".**

Society Structure

The IPBC collaborates with municipalities, universities, and civil society associations to promote public policies that set in motion social welfare dynamics.

Consolidated lines of research:

1. Metrics of common good dynamics at the municipal level.
2. Design of public policies for the common good.
3. Educational quality metrics in HEI.
4. Seminar on social responsibility and common good approach.
5. Legislative Observatory on the activity of the Congress of Puebla.
6. Design and validation of a scale to measure leadership for the common good.
7. Studying out of poverty.
8. Common good perspective on environmental issues.
9. Human rights as common goods.

5. Economic Intelligence and Research Center

Director: Alfonso Mendoza Velázquez

Its objective is to generate scientific and academic knowledge and provide specialized analysis for decision-making on economic issues, finance, public finance, wellbeing, and political and economic evaluation systems.

Main projects:

Mobile technology, business skills, and access to financial services, whose objective is to determine the impact of a **training** program **in business skills**, a training program in financial education, and the provision of a smartphone with access to internet service on four measures of financial inclusion, measures of income, spending and family savings, as well as on the start-up and operation of micro-businesses, in order to determine the impact of the treatment on family wellbeing. This project was developed with investment from the Conahcyt - SEP Fund.

The slowdown in Mexico - US migration: Why is Texas different? funded for development by the Mission Foods Texas Mexico Center.

C. 4 Study Centers

Team name	Responsible	Particular lines	Target

Center for Bioethics	José Manuel Madrazo Cabo	Life sciences and bioethics. Human and Social Development.	We are a center for multidisciplinary and interdisciplinary studies in personalist bioethics, which studies, trains, researches, and carries out activities in the field of bioethics, in the field of life and health sciences, with an impact on society, in the medical, scientific, technological, political and legal fields; as a source of opinion that unifies values, science, and life.
Research Center for Science and Religion	Juan José Blázquez Ortega	Dialogue between science, faith, and culture	To promote contemporary dialogue between science and religion through research, teaching, and dissemination, particularly in Latin America.
Research Center for Guadalupe Virgin Studies	Gerardo Valle Flores	Guadalupe Event	To articulate and promote the work of research, study, and dissemination of the Guadalupe Event. Actively contribute to the study of the Guadalupe Event in its essential functions of creation, diffusion, and critique of knowledge. Collaboration with the education of the Church through classes.
Studies Center for Family and Society	José Carlos Ortiz Muggenburg	Family and society	The team of the Studies Center for Family and Society assumes the purpose of being a university center for interdisciplinary studies and service to families, with internal and external relevance, which is a reference in the family area through research, teaching, and extension, with the capacity to generate proposals and dialogue with the various social agents for family culture.

D. 19 teams at the stage of research groups or academic groups

Team name	Responsible	Main line of research	Particular lines
Research in Novohispanic Culture Studies	María Pía Benítez de Unánue	Human person, dignity, and transcendence	Substantial innovation in teaching, learning, evaluation, and research processes for integral education and academic excellence. Liaisons and alliances with the global society. Social and cultural contribution to the global community.
Supply Chain Logistics Systems Planning	Santiago Omar Caballero Morales	Supply chain optimization. Logistics management Systems	Supply Chain Optimization. Logistics Management Systems.
Faculty professionalizati on	Paulina Iturbide Fernández	Education	Transformation or improvement of one's teaching practice based on the recovery, analysis, illumination, and intervention of classroom processes. Theories of education for the professionalization of professorss. Education policy, institutional management and curriculum for faculty transformation
Ethics and Self-Regulation in the Educational Process	Juan Martín López Calva	Education	Teaching-learning processes and self-regulation. Theories of Education, Ethics, and Autonomy. Educational policy, institutional management
Biotecnoenviron mental	Genoveva Rosano Ortega	Environment and sustainability	Life sciences and bioethics. Innovation and technology.
Well-being of human talent	Ana María Alejandra Herrera Espinosa	Human and Social Development System	Human talent management and development. Organizational Culture and Workplace Well-Being.

Social Science Research Group	Herminio Sánchez de la Barquera y Arroyo	Human and Social Development.	Human and Social Development.
Health Sciences	Virginia Sedeño	Community Health	Immunopathological basis of non-communicable diseases. Management and educational processes in Health Sciences.
Humanitarian Logistics and Resilience in Logistics Operations in Different Sectors	Diana Sánchez Partida	Productivity and competitiveness Social economy	Humanitarian Logistics. Resilience in Logistics Operations in the different Economic Sectors. Humanitarian Technology.
Agrologistic Systems	Yésica Mayett Moreno	Logistics and supply chain	Redesign of supply chains and logistics in the agricultural sector. Food safety in the food production-marketing chain. Models of associativity and integration of small producers into the value chain. Socioeconomic studies of agricultural products.
Academic Body in Competitiveness and New Ways of Working	Cynthia M. Montaudon Tomas	Competitiveness and Strategy	Entrepreneurship and innovation Productivity and competitiveness
Basic Science in Engineering	Damian Emilio Gibaja Romero	Mathematical modeling	Mathematical modeling Materials characterization
Research group of the academic programs of film and communication.	Omar García Macías		Cinema, communication, and the common good The media, the construction of the image, and cultural identity
Nursing research	Ilse Hidalgo Arce Edgar Mauricio Ramírez Pérez	Community Health	Nursing education and health promotion. Integral nursing care. Nursing care management.
Family and school	Emma Verónica Santana Valencia	Family and society	Formative and educational processes from the university. Family dynamics and its social projection. Family, inclusion, and education.
Person and Action	Rubén Sánchez Muñoz	Human person, dignity, and transcendence	Person and transcendence
Academic Body of Mexican History	David Sánchez Sánchez	Human person, dignity and transcendence	Novo Hispanics and viceroyalty. History of Puebla. History of Mexico through art and education.
Genetic resources for agrifood sustainability	José Terrones Salgado	Environment and sustainability	Strategies for crop and livestock production. Conservation and use of natural resources.
Human nutrition research group	Ma Lourdes Meza Jimenez	Community health	Studies on nutrition and human nutrition.

E. Research projects Externally financed projects.

Technical Director	Project name	Funded by	College	Amount deposited
María del Rocío Baños Lara	Expression profile of snoRNAS (small nucleolar RNAs) in acute lymphoblastic leukemia 2 and study of their role in the disease.	Conahcyt	Medical sciences	3,009,405.00
Francisco Javier Sánchez Ruiz	Efficient and sustainable integration of supply chains in the State of Puebla.	PRONACE - Conahcyt	Biological Sciences	97,000.00
Omar Aguilar Mejía	Electricity Microgrids for the Electrification of Isolated Communities	Conahcyt Sectorial Fund - Secretariat of Energy - Energy Sustainability	Engineering	
Estefanía Martínez Tavera	Biomonitoring and environmental health associated with water quality in the Alto Atoyac watershed, Puebla, for priority attention to health issues through environmental education and public policies that allow for effective change.	PRONACE - Conahcyt	Biological Sciences	92,250.00
Alfredo Cuecuecha Mendoza	Mobile technology, business skills, and access to financial services	Conahcyt Basic Science	Social Sciences	
Elizabeth Bautista Rodríguez	IXTAB: Molecular biomarkers and psychosocial risk factors associated with suicidal behavior in psychiatric patients in the State of Campeche.	Conahcyt	Biological Sciences	-
Elizabeth Bautista Rodríguez	Neuropsychological Effects on Individuals with COVID-19	Conahcyt	Biological Sciences	485,000.00
María del Rocío Baños Lara	Study of COVID-19 and other respiratory viruses in pediatric cancer patients.	Concytep	Medical Sciences	396,580.00
Elizabeth Bautista Rodríguez	Detection of neonatal sequelae caused by COVID-19.	Research Grants 2021 Ignacio H. de Larramedni	Biological Sciences	
ExpoSciences	National Network of Youth Activities in Science and Technology	5th Siemens Gamesa Renewable Energy	N/A	852,000.00
Fabiola Carolina Espinosa Gómez	Diagnosis of human-wildlife interactions in the historical hunting relationship in communities of the Sierra Norte of the State of Puebla, an area of potential jaguar distribution.	Concytep	Biological Sciences	180,000.00
Martha Leticia Gaeta González	Innovation in Postgraduate Education in Puebla: Trajectory and Prospects		Arts and Humanities	74,000.00
María Teresa Herrera Rendón	Working out of poverty: accompanying the poor to become dignified agents of their development	Call for applications from the University of the Sacred Heart of Jesus in Milan, Italy.	Social Sciences	59,645.76
Fabiola Carolina Espinosa Gómez	Proposal for a management plan of an UMA for the conservation of the teporingo rabbit (Romerolagus diazi) in the locality of Santiago Xalitzintla.	Concytep	Biological Sciences	140,000.00
Virginia Sedeño Monge	Health diagnosis of brick kiln workers in the community of San Matías Cocoyotla, San Pedro Cholula, Puebla.	Concytep	Health Sciences	160,000.00
N/A	Donation for student participation in the International Accreditation to London	Donation Karina Stamens	N/A	60,000.00
José Alberto Tenorio González	UPAEP- Concytep Support for ExpoSciences Puebla 2022	Concytep	N/A	150,000.00

Juan José Blázquez Ortega	ISSR Latin American Libraries	International Society for Science and Religion (ISSR)	N/A	
Rosa María Cantón Croda	"Fair and efficient allocations in the face of a sanitary contingency such as COVID-19: State of Puebla as a subject of application".	Concytep	Engineering	125,000.00

F. ExpoSciences

In the same area of research, we mention that for **20 years,** we have supported ExpoSciences, the largest science and technology event organized in Mexico, which brings together the entire student population from preschool to higher education. It is a **RED program recognized by the International Movement for Leisure Activities in Science and Technology (MILSET, acronym in Spanish)** that is carried out to promote the participation of children and young people in scientific and technical research, innovation, and dissemination projects. For years, we have supported this event since it allows the participation of institutions and companies dedicated to education, as well as the intervention of disseminators and professors.

G. Aerospace projects

It is called AzTech Sat-1 (ASI), about our Aztec (Az) culture, and also represents a Technology Challenge (Tech) of the first Satellite (Sat-1) project with the National Aeronautics and Space Administration (NASA). The AzTech Sat-1 is a CubeSat class nanosatellite managed, designed, and built by an interdisciplinary team of engineering and other students from UPAEP.

MISSION

Design, construction, and operation of a CubeSat class nanosatellite, named AzTech Sat-1, with the primary purpose of exploring satellite intercommunication with the GlobalStar constellation and testing satellite intercommunication with the GlobalStar constellation to develop, implement and integrating a subsystem in the nanosatellite which enables the improvement of communication in future CubeSat class nanosatellite missions.

AzTechSat-1 was a **CubeSat** developed by the **Mexican** university **UPAEP**, launched on **December 5, 2019,** aboard the **SpaceX CRS-19** mission **for NASA** and was delivered to the International Space Station, from where it was **deployed on February 19, 2020,** and within an hour began to meet mission requirements.

Gxiba-1

Winning project of the sixth call of the UN Office for Outer Space Affairs (UNOOSA) and the Japan Aerospace Exploration Agency (JAXA).

JAXA will be in charge of transporting our Gxiba-1 satellite to the International Space Station to be later deployed and start the execution of its mission.

Gxiba-1 is a **CUBESAT format satellite** that **will take photographs, from a low orbit (400 km), of active volcanoes in Mexico**, especially Popocatepetl, in order to vectorize the propagation of ash from its eruptive stages and thus generate an early warning system for the protection of the population near the volcano.

In this project **7 professors and 53 students** from various engineering programs design and build the Gxiba-1 which recently passed JAXA's phase 0-1-2 evaluation and moves on to phase 3 consisting of preliminary tests before being shipped to Japan for its launch into space scheduled for 2024.

Aztechsat constellation

An inter-institutional project between **UPAEP, UNAM, Universidad Panamericana, Universidad Aeronáutica de Querétaro, Universidad Politécnica de Querétaro, and Agencia Espacial Mexicana** to design, **build, and operate 4 satellites**, based on a unique design, to monitor and track marine mammals from space in order to promote their protection, and thus make more rational use of ocean resources.

The project is structured in **13 systems where students and professors from the 5 universities** participate directly under the leadership of Eugenio Urrutia Albisua, coordinator of aerospace projects at UPAEP and general director of the project. Last May, within the framework of FAMEX 2023, the **project passed the first evaluation by NASA, called "Mission Concept Review,"** or MCR, for its acronym in English.

The 4 satellites will be launched into space by NASA in collaboration with the Mexican Space Agency.

H. UPAEP Projects with Social Relevance

NAME OF PROJECT	MAIN OBJECTIVE	COLLEGE	SOCIALLY RELEVANT ACADEMIC SYSTEM
Challenges of innovation, quality, and inclusion in Higher Education towards 2030 in Mexican and Chilean institutions.	To analyze the challenges presented in the framework of the 2030 agenda to promote innovation, improve quality, and expand rights for access to Higher Education in institutions in Mexico and Chile.	Arts and Humanities	Human and social development
Socio-affective processes in the university environment.	To promote socio-affective processes in the university environment.	Arts and Humanities	Human and social development
Impact of COVID-19 on college students: emotional states, coping strategies and self-regulation of learning.	To analyze the emotional state, forms, and strategies of self-regulation of learning in university students in response to teaching.	Arts and Humanities	Human and social development
Professional learning communities	To generate a training proposal for the constitution of professional learning communities based on reflective and situated work with professorss in the city of Puebla.	Arts and Humanities	Human and social development
Women writers and writing about women in early modernity.	To detect and recover women and/or marginalized novo-Hispanic texts through their subsequent study, edition, and dissemination to contribute to the novo Hispanic cultural memory of works that have been forgotten due to decontextualization or misunderstanding.	Arts and Humanities	Human and social development
Production of subjectivity in processes of educational and family inclusion in the field of disability.	To unveil how the effects of truth that inclusive education policies have had on the processes of subjectivization of disability produce new forms of exclusion.	Arts and Humanities	Human and social development
Recombinant penicillin amidase production	To develop an efficient method for laboratory and pilot plant-scale production of penicillin amidase.	Biological Sciences	Life sciences and bioethics

Evaluation of the antagonistic effect of probiotic bacteria isolated from pulque against different pathogenic microorganisms.	To evaluate the in vitro antagonistic effect of probiotic bacteria isolated from pulque on pathogens of medical relevance in Mexico in order to assess the potential of traditional fermented beverages as adjuvants in the treatment of infectious diseases.	Biological Sciences	Life sciences and bioethics
Metabolic engineering of a strain of the oleaginous yeast Yarrowia lipolytica for producing a palmitoleic acid-enriched oil for biodiesel generation.	To develop a strain of the oleaginous yeast Yarrowia lipolytica that accumulates oleic and palmitoleic acid in its oil by inactivation or mutagenesis of key enzymes using CRISPR-Cas9 genome editing technology and analysis of its oil by gas chromatography and differential scanning calorimetry to produce an oil with a fatty acid profile suitable for biodiesel production.	Biological Sciences	Life sciences and bioethics
Advanced treatment system for the removal of emerging contaminants (antibiotics) and recalcitrants (dyes) in wastewater from the slaughtering process of the poultry industry, reuse of reclaimed water, and production of biohydrogen.	To evaluate the performance of the wastewater treatment system of the poultry slaughtering industry integrated by a Microbial Electrochemical Cell (MEC) coupled to the Fenton process for the removal of antibiotics, recalcitrant pollutants (dyes), and biohydrogen generation.	Biological Sciences	Life sciences and bioethics
Analysis of the expression profile of miRNAs associated with neuroinflammation caused by gestational diabetes in neonates in search of early diagnostic and prognostic biomarkers of neurodevelopment.	To analyze the expression profile of miRNAs associated with neuroinflammation caused by gestational diabetes in neonates in search of early diagnostic and prognostic biomarkers of neurodevelopment.	Biological Sciences	Life sciences and bioethics
Microplastics in watersheds: presence, origin, degradation processes, and accumulation. Case study: Alto Atoyac watershed. Fourth Stage.	To study the processes of generation, degradation, and accumulation of microplastics in the biota of the Valsequillo dam, Upper Atoyac basin, through physicochemical determinations and multivariate statistical techniques to identify their possible toxic effects on the environment.	Biological Sciences	Life sciences and bioethics
Molecular detection of Rickettsiae and their association with ticks (Ixodidae) and fleas (Siphonaptera) obtained from pet dogs and cats from three socioeconomic regions of the state of Puebla.	To identify the presence of Rickettsiae and their association with ticks (Ixodidae) and fleas (Siphonaptera) obtained from pet dogs and cats from three socioeconomic regions of the state of Puebla, Mexico.	Biological Sciences	Life sciences and bioethics

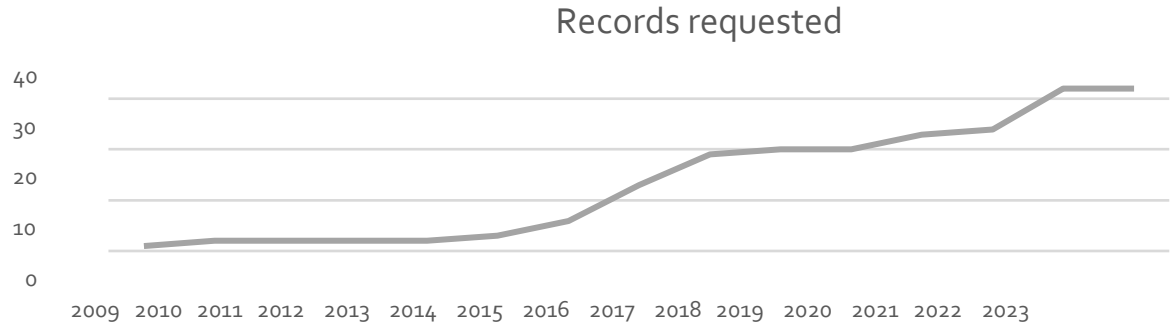
Cerium (Ce) and Silver (Ag) nanoparticle doped membranes for air and water pollutant treatment	To synthesize membranes from lignin obtained from lignocellulosic waste by the hydrothermal and pyrolysis method, to be implemented in wastewater treatment systems, CO_2 capture, through bioelectrochemical reactors and combined cycles as renewable electricity generators.	Biological Sciences	Life sciences and bioethics
Sustainable Environmental Engineering Systems Research	To study and develop sustainable industrial processes and/or products (water and waste treatment) through chemical characterization, environmental impact diagnostics, laboratory and/or pilot plant tests, circular engineering (pollutant valorization), treatment methodologies and sustainable development models to solve real environmental problems.	Biological Sciences	Life sciences and bioethics
Evaluation of the pharmacological activity of medicinal mushroom extracts.	To evaluate the bioactive molecules of Ganoderma lucidum mushroom extracts of Mexican and Chinese origin using different extraction methods through spectroscopic tests and to measure their antimicrobial activity against clinically isolated bacteria.	Biological Sciences	Life sciences and bioethics
Agave compost as a soil improvement agent in physicochemical and bacterial terms.	To evaluate agave compost's physicochemical and bacterial functional potential for use as a soil improvement substrate.	Biological Sciences	Life sciences and bioethics
Evaluation of microencapsulated Azotobacter vinelandii in the degradation of organophosphates in situ and determination of effects on genotoxicity and bacterial microbiota in soil.	To evaluate the degradation of organophosphates in situ by microencapsulated Azotobacter vinelandii and to determine effects on bacterial microbiota and genotoxicity in soil using molecular methodological tools and biomarkers.	Biological Sciences	Life sciences and bioethics
Brain mapping of the effects of random transcranial noisy electrical stimulation in student patients (UPAEP) with post COVID executive function deficits.	To evaluate the effect of random transcranial noisy electrical stimulation on neuronal electrical activity in patients with post-COVID executive function deficits.	Biological Sciences	Life sciences and bioethics
Obtaining and identification of natural plant extracts and their pharmacological application.	To evaluate, identify, and characterize the antimicrobial action of extracts of two medicinal plants such as moringa oleifera and Heterotheca inuloides, using the microdilution method to determine the minimum inhibitory concentration of aqueous, chloroformic, and ethanolic extracts on a representative group of resistant pathogens involved in nosocomial and community infectious	Biological Sciences	Life sciences and bioethics

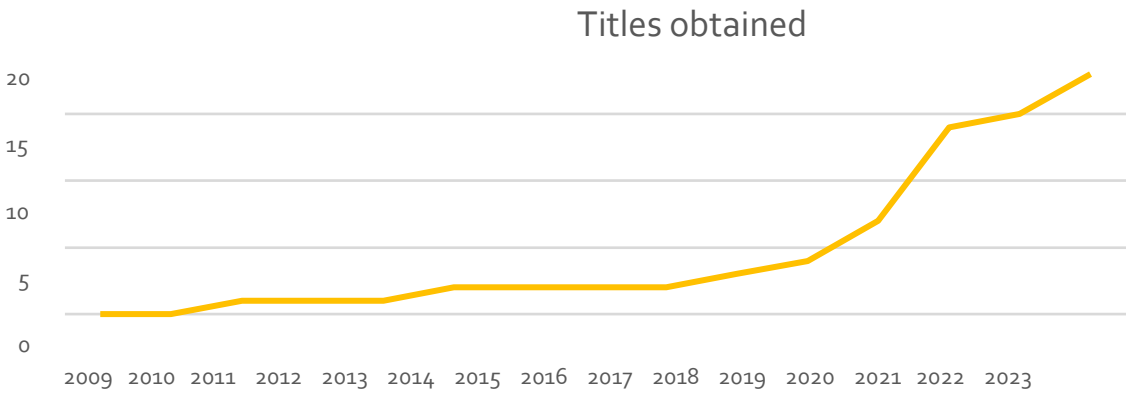
	diseases, isolated from the department of the Public Health Laboratory of the State of Puebla.		
Determination of bioactive compounds in foods formulated with functional ingredients (second part).	To determine the presence of bioactive compounds in foods based on functional ingredients.	Health Sciences	Life sciences and bioethics
Menopause in occupational health dynamics	To determine the conditions of menopause in Mexico from the labor market perspective and to develop a series of recommendations for public policy in this area.	Economic and Administrative Sciences	Competitiveness and Strategy
Exploration and exploitation of the functionalities of food waste, endemic and underutilized Mexican foods for the formulation of functional foods (Continuation of previous project).	To take advantage of the functionalities of an endemic food (pataxte), an underutilized one (bamboo shoots), and poblano chili residues through the formulation of food or food additives to promote their use and contribute to the circular economy and food sovereignty.	Economic and Administrative Sciences	Life sciences and bioethics
Efficient and sustainable integration of the supply chains in the State of Puebla.	This project focuses on making efficient and sustainable the logistics distribution system of the supply chains linked mainly to the retail trade of the food industry (not exclusively) in the city and state of Puebla.	Economic and Administrative Sciences	Competitiveness and Strategy
Identification of the interaction sequence of the ECA2 receptor with sarscov2 proteins in a sample of patients with COVID19 and ECA2 and TMPRSS2 expression level(Part III).	To identify prognostic factors in the course of SARSCOV2 disease such as variants in the ECA2 interaction sequences and expression level of ECA2 and TMPRSS2 in patients who had COVID19	Medical Sciences	Life sciences and bioethics
Guarantee Prices, Migration Experience, Remittances and Corn Productivity: Evidence from three municipalities in Puebla.	To determine the impact of the guarantee price program on the productivity of corn producers in three municipalities of the Sierra Norte de Puebla, as well as the interaction of this program with the migrant experience and the receipt of remittances.	Social Sciences	Competitiveness and Strategy
To get out of poverty: to accompany the poor so that they become worthy agents of their own development.	To prove that accompaniment is a way to lift people out of poverty in a dignified manner.	Social Sciences	Life sciences and bioethics
Human capital and financial capital of Mexican migrant in the U.S.	To contribute to research on the human and financial capital obtained by migrants from Mexico to the United States and the use of this capital to improve the quality of life of migrants.	Social Sciences	Competitiveness and Strategy
Bionic Instrumentation in Aerospace	To design, build, and integrate Bionic instrumentation with Aerospace Technology Applied to Health.	Engineering	Innovation and technology

Technology Applied to Healthcare			
Bionic technology to assist visually impaired people	To design, build, and integrate wearable systems with flexible electronics applied to healthcare.	Engineering	Innovation and technology
Development of communication systems for high-altitude balloon platforms	To develop and test different radio frequencies for transmitting and receiving information.	Engineering	Innovation and technology
Design and characterization of sustainable materials through mathematical modeling	To analyze the characteristics of sustainable materials for their characterization and subsequent design of materials using mathematical modeling.	Engineering	Innovation and technology
Power converters and mechatronic systems for distributed generation	To mitigate the problem of high technological dependence on foreign countries in the area of distributed generation through technological development, production, and commercialization of microinverters, centralized inverters and solar trackers.	Engineering	Innovation and technology
Automated stone mill for nixtamal	To promote the preparation of nixtamal and tortillas in Mexican cuisine through the development of a highly efficient, automated, direct-drive stone mill for nixtamal, with an innovative corn-feeding system.	Engineering	Innovation and technology
Hybrid Photovoltaic Wind Energy Generation System, through the use of the kinetic energy produced by buses, in Puebla.	To develop and implement an appropriate technological innovation model that allows the realization of a hybrid solar wind energy system implemented in the urban area of Puebla to generate clean energy in different parts of the city and help mitigate the growing energy demand and demonstrate according to the research done the advantages of this hybrid system compared to others, and thus make the transfer and use of this technology in the sector of intelligent energy generation.	Engineering	Innovation and technology
Multiphase modeling and simulation of major accidents	To mathematically model severe accidents incorporating multiphase (hydrodynamics with laminar and/or turbulent regime, mass transport with reaction and energy transport) by applying CFD techniques.	Engineering	Innovation and technology
Development of Bionic Instrumentation Applied to the Veterinary Field	Development of Bionic Instrumentation focused on the Veterinary area.	Engineering	Innovation and technology
Hydrodynamic simulation of multiphase reaction systems	To Implement simulations of hydrodynamic behavior to predict liquid distribution in packed reactors and a simulation of the hydrodynamics of a capillary reactor using interface tracking CFD techniques.	Engineering	Innovation and technology

Modeling, simulation, and control of electro dynamic systems using intelligent control techniques.	To analyze, model, and control different configurations of electro-dynamic systems to regulate the variables of interest under different operating conditions using controllers based on intelligent control techniques and bio inspired algorithms.	Engineering	Innovation and technology
Research and development of optical sensors and optomechatronic devices based on interferometry, lasers, and optical fibers.	To research, develop and implement optical sensors and optomechatronic devices based on interferometry, lasers, optical fibers and the optomechatronic devices based on interferometry, lasers, optical fibers and the optical properties of synthesized materials.	Engineering	Innovation and technology
Designing Sustainable and Environmental Strategies for the Supply Chain	Development of inventory, production and distribution strategies that integrate SD criteria within the CS.	Engineering	Competitiveness and strategy
Determination of pain threshold by analysis of multiple physiological signals.	To analyze different physiological signals, such as EEG, EMG, ECG, electrodermal activity and respiration in order to identify whether test subjects are experiencing any pain (induced with cold (ice) and heat (compresses)) and determine their threshold.	Engineering	Innovation and technology
Project Gxiba: Observation of active volcanoes in Mexico	To develop a 1U CubeSat, called "Gxiba 1", to observe active volcanoes in Mexico and analyze ash dispersion to alert the population in the volcano's vicinity.	Engineering	Innovation and technology
MEVA - Monitoring and Exploration of Active Volcanoes predicting possible eruptions could allow early warning and evacuation of affected areas.	Multidisciplinary project investigating methods for predicting changes in volcanic activity that could strengthen our understanding of the potential for predicting volcanic eruptions. Densely populated areas surround several of the active volcanoes in Mexico and may be able to predict volcanic eruptions.	Engineering	Innovation and technology

I. Patents.





Inventors	Type of record	Title of the invention
Fidel Pacheco Garcia, Genoveva Rosano Ortega	National Patent Application	Process for the removal of sulfide-type compounds in sulfide waters
Arllene Perez Arellano, Manuel Gonzalez Perez, Maykel Gonzalez Torres, Aurelio Heredia, Cesar Santiago	National Patent Application	High vacuum reactor
Juan Carlos Cisneros Ortega, Mónica Cárdenas Jasso, José Gilberto Montaño Márquez	Industrial Model Application	Industrial model of means of transport for people with reduced mobility transformable into a stretcher.
Eloísa Aparicio Ley; Beatriz Pérez Armendariz; Elie Girgis El Kassis; Judith Cavazos Arroyo; and Genoveva Rosano Ortega	National Patent Application	Functional beverage with added lactic acid bacteria
Edgar Peralta Sanchez; Pedro Celestino Castellanos Morales and Jaime Jose Rodriguez Rivas	National Patent Application	Bidirectional interlocked DC-DC power converter with digital control
Juan Carlos Cisneros Ortega; Gilberto Montaño and Aurelio Heredia Jiménez	National Patent Application	Electro-pneumatic air and ground handling simulation system
Juan Carlos Cisneros and José Gilberto Montaño	National Patent Application	Aseptic container agglomerate material
Héctor Simón Vargas Martínez; Rodrigo Ortega Rivas and René Cruz Acosta	National Patent Application	Service Robot
Manuel Alejandro Rodriguez Marun and Edgar Peralta Sanchez	National Patent Application	Red Can Simulator for Automotive Systems
Juan Carlos Cisneros Ortega; Gilberto Montaño; Aurelio Heredia Jimenez; María de la Luz García Cruz and Manuel Jesús Heredia Ríos	National Patent Application	Actuator control and automation system
Edgar Peralta Sánchez and Pedro Celestino Castellanos Morales	National Patent Application	Energy recovery system for electric transport
Edgar Peralta Sánchez and Pedro Celestino Castellanos Morales	National Patent Application	Controllers for CD-CD power converter Bidirectional interlocked power converter with digital control
Manuel González Pérez; Horacio Alfonso Ramírez; Reyes Montaño and Juan Manuel López Oglesby; Manuel González Pérez; Horacio	Industrial Model Application	Transbucal Industrial Model for osteosynthesis

Alfonso Ramírez; Reyes Montaño and Juan Manuel López Oglesby		
Manuel Gonzalez Perez; Horacio Alfonso Ramirez Reyes Montaño and Juan Manuel Lopez Oglesby	National Patent Application	Transbuccal for osteosynthesis
Aurelio Horacio Heredia Jiménez; Enrique Vázquez Cepeda; Marian Denisse Velver Ríos and Roberto Carlos Ambrosio Lázaro; Aurelio Horacio Heredia Jiménez; Enrique Vázquez Cepeda; Marian Denisse Velver Ríos and Roberto Carlos Ambrosio Lázaro	National Patent Application	Sound amplifier device for hearing impaired people
Héctor Simón Vargas Martínez and Efraín Gustavo Barragán Jácome	National Patent Application	Mechanical structure for assistance robot
Manuel González Pérez; Daniel Pacheco Bautista; Juan Manuel López Oglesby; Manuel González Pérez; Daniel Pacheco Bautista; Juan Manuel López Oglesby	National Patent Application	System and Method for alignment of short DNA reads using programmable logic devices.
Edgar Peralta Sánchez; Félix Quirino Morales; Daniel Alberto Flores Alonso; and Sergio Alejandro Moreno Cardeña	Industrial Design Application	Industrial Mill Design

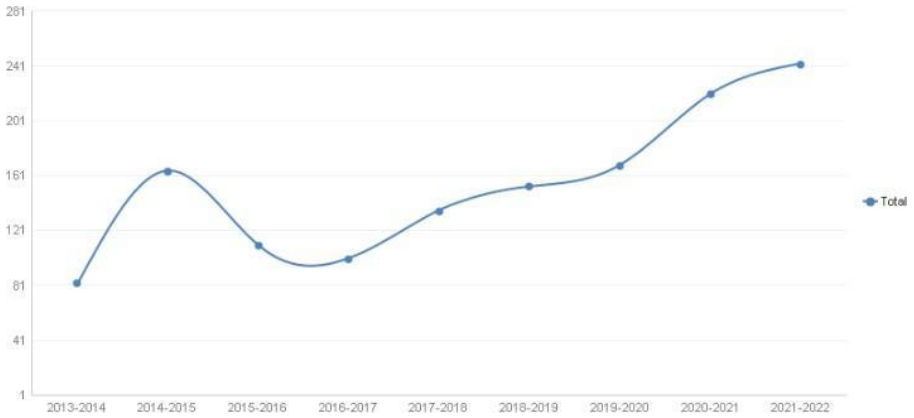
Requests

Inventors	Type of record	Title of the invention
Juan Carlos Cisneros Orteg; Mónica Cárdenas Jasso and José Gilberto Montaño Márquez	National Patent Application	Means of transport for people with reduced mobility transformable into a stretcher (4th REQUIREMENT)
Edson Olmedo Urrutia and Héctor Simón Vargas Martínez	National Patent Application	Electric means of transportation for people with motor disabilities in lower extremities.
Edgar Peralta Sánchez and Félix Quirino Morales	National Patent Application	Three-phase power parameter inverter
Genoveva Rosano Ortega; Francisco Javier Sanchez Ruiz; Carlos Arturo Vega Lebrun; Juan Francisco Mendez Diaz; Saul Abel Mendoza Martinez and Rene Mendoza Martinez	National Patent Application	Method for separating materials from multilayer containers using stillage
Nathalia Monserrat Cuellar Milian; Genoveva Rosano Ortega; Francisco Javier Sánchez Ruíz; Carlos Arturo Vega Lebrún; Juan Francisco Mendez Díaz; Saúl Abel Mendoza Martínez; and René Mendoza Martínez.	National Patent Application	Method to produce ethanol from vinasse enriched with cellulose separated from multilayer containers.
Joel Contreras Lima; María de la Luz García Cruz; José Raciel Flores Benítez; Edson Olmedo Urrutia; Jorge Luis Rivera Gómez; Enrique Rafael García Sánchez; Héctor Simón Vargas Martínez; Aurelio Heredia Jiménez and Francisco Fernando Eugenio Urrutia Albisua.	National Patent Application	Satellite communication device
Genoveva Rosano Ortega; Laura Isabel Carrillo Flores and Sofía Esperanza Garrido Hoyos	National Patent Application	Method for treatment of mine tailings
Edgar Peralta Sánchez and Félix Quirino Morales	National Patent Application	Grid Synchronized Inverter-Based Energy Recovery System
Juan José Reyes Salgado	National Patent Application	Thermal decay measurement device

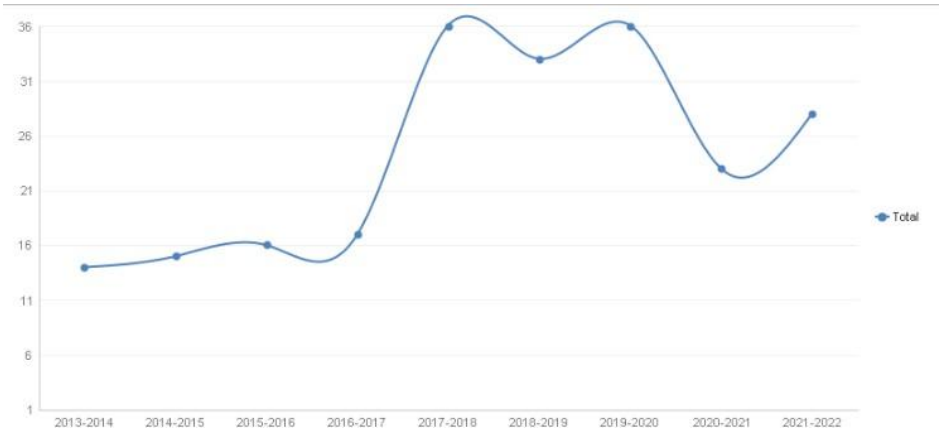
Alina Santillan Guzman; Enrique Quiroga Gonzalez(BUAP); Rebeca Dorantes Carvajal and Marco Abraham Perez Ramirez	National Patent Application	Electrode holder headband for electroencephalography
Alina Santillan Guzman; Enrique Quiroga Gonzalez(BUAP); Rebeca Dorantes Carvajal and Marco Abraham Perez Ramirez	National Patent Application	Electrode for electroencephalography
Alina Santillan Guzman; Enrique Quiroga Gonzalez(BUAP); Rebeca Dorantes Carvajal and Marco Abraham Perez Ramirez	National Patent Application	Signal acquisition system for electroencephalography
Alina Santillan Guzman; Enrique Quiroga Gonzalez(BUAP); Rebeca Dorantes Carvajal and Marco Abraham Perez Ramirez	Industrial Model Application	Electroencephalography Headband Model
Alina Santillan Guzman; Enrique Quiroga Gonzalez(BUAP); Rebeca Dorantes Carvajal and Marco Abraham Perez Ramirez	Industrial Model Application	Electroencephalography electrode model
Jorge Rafael Aguilar Cisneros	National Patent Application	Message display system

J. General publications

Articles in scientific journals



Books



Research productivity 2022-2023

During the period 2022-2023, UPAEP demonstrated a solid commitment to research productivity. This commitment was reflected in the publication of a total of **277 journals,** finding **158 articles in refereed scientific journals, 119 were** in **journals recognized** in prestigious indexes such as SCOPUS. In addition, the institution expanded its reach by publishing **42 books,** consolidating its contribution to advancing knowledge in various disciplines. These achievements highlight UPAEP's role as an academic entity promoting high-quality research, which benefits the academic community and society.