

Events

APEGA 2025

Pensamiento Grafico entre Docencia, Representación e investigación

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From October 2nd to 4th 2025, the Escuela Técnica Superior de Arquitectura y Edificación (ETSAE) of the Universidad Politécnica de Cartagena (UPCT) hosted the *Congreso Internacional de Expresión Gráfica Aplicada a la Edificación APEGA 2025* [1]. The biennial event has reached its XVII edition. The conference theme, *Pensamiento Grafico/ Graphic Thinking*, refers to the process that evolves from conceptual synthesis to the representation of reality.

The event was mainly held in the panoramic Salón de Actos Isaac Peral, the venue for the two plenary sessions located on the third floor of ETASE with access from Calle Real, just a few steps from the Plaza del Ayuntamiento and offering an all-round view of the intense and dynamic maritime landscape of the Puerto Comercial of the city. In the foyer outside the hall the *Exposición Edigráfica* was installed as part of the congress and remained accessible throughout the entire event. At each edition, the selected works published in the Exhibition Catalogue compete for the *Concurso Juan Manuel Raya*, established to reward the best educational and research works in the field of the *Expresión Gráfica aplicada a la Edificación*.

Among the 88 selected contributions, 51 were presented during the

two-day of the conference, involving a total of 192 authors from Spain, Italy, and Latin America.

LINEA 1. Docencia y Metodología/ Teaching and methodology collected 22 contributions dedicated to teaching methods and graphic expression exercises that highlight the teacher's mastery and skill. *LINEA 2. Trazo y Representación/ Drawing and Representation*, included 23 contributions on the process of conceptualisation and graphic representation, with a clear emphasis on the importance of representational quality. Finally, *LINEA 3. Investigación y Difusión/ Research and dissemination*, consists of 43 contributions aimed at advancing research and development of graphic thinking in the artistic, architectural and engineering fields.

During eight mixed plenary sessions participants presented ten-minute talks on theoretical and applied studies covering a wide range of interdisciplinary topics, with Cultural Heritage as the main field of investigation and experimentation.

At the opening ceremony the event was introduced by institutional greetings of the members of the Honor Committee, including Mathieu Kessler Neyer, Rector of UPCT, who emphasized the fundamental role of academia in the dialogue between professional practice and teaching, José Antonio

Barrera-Vera (Departamento de Ingeniería Gráfica dell'Universidad de Sevilla), President of the Asociación de Profesores de Expresión Gráfica aplicada a la Edificación APEGA, Antonio Caballero Pérez, CEO of the Universidades de la Comunidad Autónoma de la Región de Murcia (CARM), Antonio Mármol Ortuño, President of the Colegio Oficial de Aparejadores, Arquitectos Técnicos e Ingenieros de Edificación de la Región de Murcia y de MUSAAT (COAATIEMU), Fernando M. García Martín, Head of the ETSAE and Ornella Zerlenga, Head of the Department of Architecture of the Università della Campania Luigi Vanvitelli and President of UID, Unione Italiana per il Disegno.

The scientific committee opened the proceedings with the presentation of the *Juan Manuel Raya* Award to Diego Celis-Estrada, Pablo Rodríguez Navarro e Teresa Gil Piqueras (Departamento de Expresión Gráfica Arquitectónica de la Universidad Politécnica de Valencia) for the work *De los planos históricos a la precisión digital: Metodología fotogramétrica y SIG para la localización y documentación de estructuras defensivas virreinales*, published in detail in the *Edigráfica* Catalogue, while the second prize went to Chiara Vernizzi e Virginia Droghetti (Department of Engineering and Architecture, University of



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Fig. 1. Logoflyer of the event.

Parma) for the graphic work presented during the exhibition and published in the contribution *Graphic Design in the Communication or Architecture projects. Considerations on targeted educational experiences*. Sixteen tables, organized into eight categories, illustrate the results of the Architecture Visualization course: based on Munari's study of harmonic structure, this activity explores how the composition and management of graphic elements, such as color; light and shadow, influence visual communication, demonstrating how students adapt established theoretical principles to personalized visual languages. The three sessions on the first day, one in the morning and two in the afternoon, were chaired by Amparo López Bernal-Sanvicente (Universidad de Burgos), Mercedes Valiente López (Universidad Politécnica de Madrid) e Ruth Pino Suarez (Universidad de La Laguna).

The first session was introduced by the keynote lecture *Pensar con el lápiz en la mano* by architect, graphic designer, painter and sculptor Vicente Martínez Gadea, member of the Royal Academy of Fine Arts of Santa María de la Arrixaca. The Murcian architect shared his experience with the audience, explaining

how his thoughts and creativity find expression through the act of manual drawing. He retraced his formative years spent between the Faculty of Architecture and the Academy of Fine Arts in Madrid and he explained the main graphic influences that guide his architectural and pictorial work.

The presentations given throughout the day shared a common theme: drawing as a cognitive tool, between training, design and memory. Educational experiences, from BIM to virtual pavilions, from play-based approaches to complementary learning strategies, demonstrate how analogue and digital representation has become a laboratory for heterogeneous technical and critical skills. 3D Scanning, Gaussian Splatting, and Information Modelling are combined within a systemic framework oriented towards Digital Heritage, aimed at revealing latent geometries and identities of place in which graphic design acts as a bridge between past, future hypotheses and imaginary scenarios.

During the second day, the four morning and afternoon sessions were moderated by José Antonio Barrera Vera (Universidad de Sevilla), Pablo Juan Jeremías Gutierrez (Universidad de

Alicante), Juan Saumell Lladó (Universidad de Extremadura) e Antonio Miguel Trallero Sanz (Universidad de Alcalá). The topics ranged from integrated digital surveying experiments to generative AI applications in a continuous dialogue between technological innovation and critical interpretation. CAD, BIM, GIS, generative and computational modelling are combined by immersive educational and exhibition strategies, outlining a framework in which representation emerges as the main tool for documenting knowledge and memory, building new possibilities for Heritage and contemporary design.

After lunch, held in the ETSAE cloister, David Martínez (ISCAR *Software de Arquitectura*) gave a presentation entitled *De la innovación CAD hacia el ingenio IA&BIM*, which introduced the afternoon sessions and provided an overview of the most widely used digital tools in design, including current and emerging trends and the integration of workflows and innovative tools for 3D modelling, real-time visualization and AI support, emphasizing the role of BIM in supporting the management of complex processes. The day ended with cocktails and dinner at The Batel Auditorium & Convention Centre, designed by SelgasCano

and located along Cartagena's seafront. Finally, on the morning of the third day, participants had the opportunity to take part in organized visits to the Roman Amphitheatre of Cartagena and the Palacio Casa Tilly, guided by José Antonio Rodríguez Martínez (JARM Arquitectura y Patrimonio [2]).

In summary, the XVII edition of the APEGA 2025 Congress highlighted the central role of *Pensamiento Gráfico* as a cognitive process aimed at integrating analysis, representation and design.

In detail, *LINEA 1. Docencia y Metodología*, presented a series of experiences resulting from the integration of analogue and digital approaches, supporting a replicable holistic educational model grounded in a balance between theoretical rigor, practical experimentation, technological innovation and emotional engagement. Part of the studies showed how direct observation enhances spatial perception, visual sensitivity and contextual understanding, from the emotional and hand-drawn life experiences developed in Genoa, Bologna, Brescia and La Plata, to the documentation of theatres and cinemas in Catania. The use of interdisciplinary teaching approaches based on Information Modeling, gamification and collaborative workshops emerge, engaging students as active cultural promoters. The integration of advanced technologies, BIM/HBIM, integrated digital surveying and VR/AR supported by a problem-solving oriented pedagogical approach, fosters the development of transversal skills. Other contributions propose the adoption of innovative teaching methods aimed at strengthening the understanding and visualization of space, from the construction of analog pop-up models for 3D illustration to digital VR experiments for the reconstruction of the Roman Baths of Lugo.

Part of the work investigates theoretical aspects, from the geometric-descriptive study of shape to Turner's pedagogical method, between linear and aerial perspective. Other studies offer technical-constructive insights, from the analysis of Hispano-Muslim truss carpentry to the cartographic techniques for urban planning.

LINEA 2, Trazo y Representación, collects the results of the integration of survey, representation, modeling and communication, from 3D printed models of the cathedrals of Girona and Narbona, to the acquisition and interpretation of the oval cloisters of Palma de Mallorca and Naples, and finally to the integrated survey, combining photogrammetry and Gaussian Splatting, of the *Sala Terrena* of the Scuola Grande di San Marco, aimed at producing immersive models.

Other contributions collect experiences of multiscale analysis and restitution, from the mapping of Guadalajara's urban Heritage, carried out in the 19th century by the National Geographic and Statistical Institute, to the interdisciplinary analysis of human-environment interaction in the Palladian landscape of the town of Piazzola sul Brenta; from the historical and graphic documentation of *Les Cavallerisses*, the ancient stables of the Hermitage of the Virgin of Grace in Vila-real, to the geometric study of Gaudi's Escuelas and the Universal Design approach for the creation of tactile models and inclusive applications for the enhancement of the Garisenda Tower in Bologna. A further group of works explores configurations, geometries and archetypes that characterize architectural and artistic Heritage, including the Cosmatesque flooring of Salerno Cathedral, the differentiated staircases of Palazzo Ricca/Cuomo and the Royal Palace of Capodimonte in Naples, the neo-Egyptian apparatus of

the Schilizzi mausoleum, and the reuse of Egyptian and Greek archetypes in the work of Juan Borchers Fernández. On the educational front, this line presents experiments in transforming Soviet avant-garde art into physical models, the use of comics to narrate architectural works and projects, the use of VR and Metaverse platforms to facilitate the management and understanding of architectural projects, the development of scripts for generating oblique axonometric projections and 3D printing of recyclable modular bricks made of thermoplastic material. The digital reinterpretation of Perugino's fresco of the *Martyrdom of Saint Sebastian*, between real and illusory architecture, and the comparison between the strategic perspective distortions of Pérez Villalta and Tintoretto emerge among the studies aimed at perspective analysis.

LINEA 3, Investigación y Difusión, among the numerous dedicated contributions, presents a set of experiences focused on the analysis, documentation, and management of Cultural Heritage. From the seismic vulnerability assessment of the monastic complex of Montecassino, to the digital documentation of the Church of San Andrés in Adamuz and the Castle of Monteagudo; from the surveying activities aimed at the restoration and enhancement of Villa Amparo in Rocafort, to the digitization of the Nabatean Arch of Bab as-Siq in Petra in Jordan. The altarpieces of the Basilica of Nuestra Señora del Prado in Talavera, the timber roof of the Church of Santiago el Mayor in Totana, the Mudéjar corbel of San Antonio Abad in Valencia, the Ermita del Pilar in Catí, the polychrome spires and domes of Acireale and Valencia, the Neapolitan domes and the late Gothic portals of Geldo, Sot de Ferrer, Alfara, Oliva, and Geldo are digitally documented and analyzed to reconstruct

their graphic compositions and geometric layouts, aimed at supporting appropriate conservation strategies.

The study of the ancient mathematical writings of Johan Ludvig Heiberg and Hero of Alexandria supports a renewed interpretation of ancient architectural design. Research on to the eclectic production of Velázquez Bosco in Guadalajara, the Portada del Mexuar, Antonio Bonet Castellana's Water Pavilion, and the Pilar y Joan Miró Foundation investigates these works and spatial constructs by examining their geometry, compositional logic and modularity.

The Ligurian mills and the Mediterranean fortifications across Italy, Spain, and Turkey are analyzed and documented as 'imprints of memory'; the graphic documentation of the XIX century Cuban cemetery and the analysis of the unrealized cemetery project in Valencia support typological studies and contribute to the enrichment of archival resources; the digitalization of

the Baths of Baiae complex in Bacoli extends the investigation to archaeological sites.

The enhancement of the *Feria de Abriages* in Seville and the installation of the inclusive, sensory Nativity scene designed by the Polytechnic School of Cáceres interpret the ephemeral as a set of devices for cultural and identity-based inclusion.

Some of the experiments propose multilayered prototyping: from the digitization and 3D printing of Salzillo's angel at Santa Clara in Murcia, to the physical reproduction of ballistic traces preserved on the northern walls of Pompeii; from the digitization, prototyping and AR/VR musealization of the nineteenth-century Gillow & Co. Furniture, to the construction of moodboards designed to guide AI image generators.

Finally, a series of contributions address digital innovation in support of Heritage design and management: from BIM for 3D Printing strategies for housing

prototyping in Chile, to the investigations of the historical development of 3D mortar printing; from Scan-to-FEM-Ready BIM processes structured in Burgos, to reparceling and urban management; from GIS/BIM interoperability to BIM/circular-economy integration. The overview is completed by studies focused on the design and production of smart glass, as well as on the functional and aesthetic role assumed by color in contemporary swimming pool design.

In conclusion, between teaching and research, the event charted a shared collective course focusing on the convergence between tradition and innovation and delineating a scenario in which graphic thinking assumes the role of a holistic and inclusive tool for knowledge, memory and sustainability.

The proceedings of the conference, edited by Josefa Ros Torres and Gemma Vázquez Arena [3], are available in open access in the UPCT online repository [4].

Notes

[1] Universidad Politécnica de Cartagena (2 octubre 2025). Los expertos destacan el impacto de la innovación tecnológica en la Expresión Gráfica. <<https://www.upct.es/noticias/2025-10-03-los-expertos-destacan-el-impacto-de-la-innovacion-tecnologica-en-la-expresion-grafica>> (accessed 29 November 2025).

[2] JARM. Arquitectura y Patrimonio: <<https://jarm-arquitectura.com/somos/>> (accessed 29 November 2025).

[3] Ros-Torres, J., Vázquez, G. (Eds). (2025). *Graphic Thinking. XVII International Conference on Graphic Expression Applied to Building APEGA 2025*. Conference Proceedings. Cartagena, 2-3-4 October 2025. Cartagena: Universidad Politécnica de Cartagena. Ediciones UPCT. ISBN: 978-84-95781-52-9. DOI: 10317/18884

[4] The UPCT digital repository is available at the following link: <<https://repositorio.upct.es/entities/publication/64a85321-c9c3-492a-b2be-3ff3db209f55>> (accessed 29 November 2025).

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