

# The Darmstadtium

[fs-architects](#), & [Chalabi architects & partners](#)

## The new Science and Congress Center of Darmstadt

Rectangular and simple - this description doesn't apply to the new Science and Congress Center in Darmstadt! On the contrary -- the complex acts as an expressive, angular sculpture with a dynamic design. The building was named after the artificial chemical element, „Darmstadtium,“ developed in Darmstadt in 1994. The building changed the city dramatically, since it is located in a prominent position opposite the historic City Palace, which creates an interesting urban context.



Darmstadtium, Wissenschafts- und Kongresszentrum Darmstadt, Germany

Architects: fs-architekten Paul Schröder Architekt BDA and Chalabi architects & partners - Photo: Claus Graubner ©

"No front, and no rear facade either," due to the central location; the building blends with its surroundings.

Despite the need for storage, loading areas, and access roads, the congress center has apparently no backside; it is transparent and open in all directions. The sloping topography of the plot was used to hide the less attractive supply functions underground.

The structure's 44 500 sqm floor area (480 000 sqfeet) is composed of four interlocking building elements. The masses made of glass, metal and stone house a large auditorium with 1,600 seats and a smaller one with space for approximately 500 people. There are also 18 conference and seminar rooms, a large foyer area, an underground garage, and a restaurant. In short, this is a multi-functional, modern conference center

with a complex spaces meeting the highest of today's demands towards environmental responsibility, energy-use and stage technic.

When choosing building materials, decisions were deliberately made to create an environmentally-friendly and low-energy material set. Like the high-quality insulated glass that results in low heating costs, or the use of the fastest renewable wooden material, bamboo, as wall and floor finishes.

The MEP-design was created with environmental aspects in mind, thus the incorporated engineering solutions (like the vacuum toilet system, the wood-chip heating, or the photovoltaic system) are fulfilling high environmentally-friendly technology standards.

Proving that a successful design process must be universal, the main architectural 'attraction' – the glass and steel flower motif covering the hall – is a very important part of the building's engineering systems as described later.

## A Complex Design Collaboration

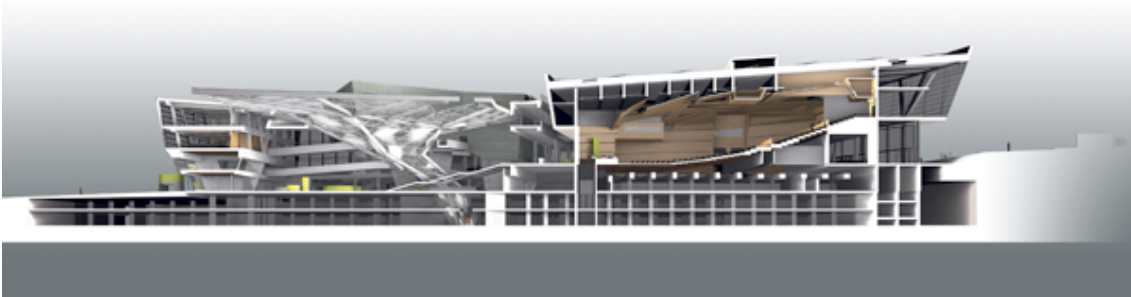
The initial design work of the development was done by a Viennese architect, Talik Chalabi. As his design was shortlisted on the architectural competition, he had to find an office in Darmstadt to cooperate with, to ensure that the execution of his design would be perfect. He asked for help from the developer, the city of Darmstadt and the Technical University. Chalabi, who had already won several competitions, but to date had not yet built them, met GRAPHISOFT client, Paul Schröder, who in turn is an experienced architect, with numerous public and private buildings. Chalabi won the competition in 2001 and started an informal working group with Paul Schröder (then Funk & Schröder Architects, fs-architect Paul Schröder Architect BDA since 2006). It was obvious that this 77 million Euro project, due to its size and complexity, would put a great demand on the architects developing the construction documentation. The sophisticated geometry of this exceptional building – one looks for straight surfaces or right angles in vain - was a very unique challenge! The task was to create a building for which there was no earlier example.



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„The design done by the Austrian colleagues was rather peculiar for me at first glance," recalls Paul Schröder. "But I soon recognized the plan's strength, developed an affinity for the building, and started to be inspired by the form," says Schröder. The work brought exciting and sometimes hectic periods to the Darmstadt office, which in addition to this large project was also developing the construction documentation for another project. "Designing and creating the construction documentation of such a building are two very different things," says Schröder. Numerous aspects of the design need to be replanned and completely rethought during the documentation, either for financial reasons or due to structural or fire protection requirements. There were also other surprises at the largest construction site of its time in the state of Hessen. For example, during the excavation work, the remains of a historic city wall and a fortified tower were discovered and later incorporated into the building.



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Approximately ten people were involved in the project for a four-year period between 2004 and 2008. „ArchiCAD® Teamwork was convincing," recalls Gregor Kahlau, one of the members of the project team. "Different parts of the project were assigned to each member and could be worked out separately. However, we all worked on one file, which included all floorplans, sections, elevations and details of the building. The integrity of the project was as well-ensured as was the transparency of the responsibilities. Without the perfectly working teamwork functions, the project wouldn't have been finished with a striking result like this," says Kahlau. "The asymmetrical layout of the building - as foreseen - acted as a multiplier: more work, more money, a lot of different combinations of different materials," says Schröder. "Not only the data exchange with Chalabi architects was without problems, but ArchiCAD also proved to be an excellent tool in the representation and description of the complex geometry. The columns followed the geometry of the facades, and therefore, most all of them tilted in two directions, which could also be implemented easily in the plan.

## A flower made of steel and glass

The creative center of Chalabi's Darmstadtium is the so-called "Calla," „the architectural equivalent of a flower, made of glass and steel." This unique building structure, which extends downwards from the roof of the building, growing more and more narrow and bending to become a vertical structure in an almost 20 meter stretch, ending in the second basement floor - is not only a visual attraction and the architectural highlight of the building, but also fulfills four functions. The "Calla" is part of the main foyer's glass roof. The shape, similar to an open flower chalice, leads the rainwater to where it is collected and used as the rinsewater of the toilets, for the air conditioning and for outdoor irrigation as well. The air sucked through the Calla heats and cools the rooms of the building and, last but not least, allows natural light in all the way through to the second underground level.



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This fascinating design idea, the synthesis of functionality and aesthetics, demands the highest quality construction documents and execution. The Calla, a metal structure with 840 panes of glass, is not like any other.

It was a difficult task to "implement" the Calla in the construction. As it seems to float freely in space, the exact location of each of its elements are described only with XYZ coordinates. The coordinate system defined in ArchiCAD was applied physically on the floor of the building, and served as a reference for the alignment of the structure during assembly.

When the new Wissenschafts- und Kongresszentrum opened its doors after three years of construction in December 2007, champagne corks also popped open at fs-architects. When Paul Schröder and his team managed to turn a competition design into a functional building, a major challenge was overcome. It wasn't an easy ride! An extraordinary project in size, shape and functionality, it has GRAPHISOFT to thank for the successfully implemented software. "ArchiCAD has proved it can be a planning tool for such complex tasks," says Schröder.

Fs-architekten has been working with ArchiCAD since 1998 and uses about 16 licenses.

### About GRAPHISOFT

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