



Vera's Mathematic World

www.verasmathematicworld.org

Vera W. de Spinadel Award 2018

Jury Protocol

September 26th, 2018

Projects received

Between May 6th and August 22nd, 91 participants from 24 countries registered to the competition (Algeria, Argentina, Austria, Bangladesh, Burundi, China, Colombia, Ecuador, Egypt, India, Iraq, Israel, Jordan, Korea, Lebanon, Libya, Morocco, Peru, Russia, Tunisia, Turkmenistan, United Kingdom, United States, Yemen). By the deadline, on August 22nd, Vera W. de Spinadel Award 2018 received 7 complete submissions. The final 7 participants come from Argentina, China, United States and Yemen.

Preliminary examination

During the preliminary examination, between August 31st and September 2nd, it was checked whether the submissions followed the general brief rules of the competition. It was determined all submitted projects followed the competition brief.

Mathematical examination

Three members of the Scientific Committee evaluated, between the 3rd and the 10th of September, the mathematical aspects of the presented proposals in regard to their correct mathematical application. They evaluated each submission in Vera's mathematic World website voting YES or NO following three criteria:

- Scientific CONCEPTUAL innovation*
- Scientific DEMONSTRATION*
- APPLICATION of the scientific innovation*

Projects		Yes	No
7-Story Pagoda	<i>Scientific CONCEPTUAL innovation</i>	3	0
	<i>Scientific DEMONSTRATION</i>	1	2
	<i>APPLICATION of the scientific innovation</i>	3	0
Organic urban design	<i>Scientific CONCEPTUAL innovation</i>	3	0
	<i>Scientific DEMONSTRATION</i>	3	0
	<i>APPLICATION of the scientific innovation</i>	3	0
Bar stool	<i>Scientific CONCEPTUAL innovation</i>	3	0
	<i>Scientific DEMONSTRATION</i>	1	2
	<i>APPLICATION of the scientific innovation</i>	3	0
Icosaedro pattern	<i>Scientific CONCEPTUAL innovation</i>	0	3
	<i>Scientific DEMONSTRATION</i>	1	2
	<i>APPLICATION of the scientific innovation</i>	2	1
Stuff table	<i>Scientific CONCEPTUAL innovation</i>	2	1
	<i>Scientific DEMONSTRATION</i>	1	2
	<i>APPLICATION of the scientific innovation</i>	2	1
Museum of Biology	<i>Scientific CONCEPTUAL innovation</i>	3	0
	<i>Scientific DEMONSTRATION</i>	2	1
	<i>APPLICATION of the scientific innovation</i>	3	0
Dynamis	<i>Scientific CONCEPTUAL innovation</i>	3	0
	<i>Scientific DEMONSTRATION</i>	3	0
	<i>APPLICATION of the scientific innovation</i>	3	0

Jury pre-examination

There are seven members in the jury: Martha Fajardo, Mina Marefat, Paola A. Zellner Bassett, Mariana Renjifo, Gina Urazan Razzini, Lisa Schmidt-Colinet and M^a Auxiliadora Gálvez Pérez. Between September 11th and September 26th, the jury members evaluated individually the submissions in the Vera's Mathematic World website according to four criteria, each on a scale from 0,0 – 25,0:

Innovative, creative CONCEPT in the approach to the resulting design
Theoretical depth of the search for HARMONY applying the Metallic Means Proportions
Soundness of the APPLICATION of Metallic Means Proportions of the project developed
Formal DEVELOPMENT of the proposal synthesized in a product design of free choice

The results of the initial evaluation were the following:

Projects		Average
7-Story Pagoda	<i>Innovative, creative CONCEPT</i>	17,4
	<i>Theoretical depth</i>	18,2
	<i>Soundness of the APPLICATION</i>	16,36
	<i>Formal DEVELOPMENT</i>	16,4
	SUM	68,36
Organic urban design	<i>Innovative, creative CONCEPT</i>	8,76
	<i>Theoretical depth</i>	12,8
	<i>Soundness of the APPLICATION</i>	11,36
	<i>Formal DEVELOPMENT</i>	10
	SUM	42,92
Bar stool	<i>Innovative, creative CONCEPT</i>	5
	<i>Theoretical depth</i>	4,72
	<i>Soundness of the APPLICATION</i>	5,98
	<i>Formal DEVELOPMENT</i>	4,8
	SUM	20,5
Icosahedron pattern	<i>Innovative, creative CONCEPT</i>	10,76
	<i>Theoretical depth</i>	10,2
	<i>Soundness of the APPLICATION</i>	7,8
	<i>Formal DEVELOPMENT</i>	9,62
	SUM	38,38
Stuff table	<i>Innovative, creative CONCEPT</i>	4,6
	<i>Theoretical depth</i>	6,4
	<i>Soundness of the APPLICATION</i>	6,16
	<i>Formal DEVELOPMENT</i>	5
	SUM	22,16
Museum of Biology	<i>Innovative, creative CONCEPT</i>	13,8
	<i>Theoretical depth</i>	10,6
	<i>Soundness of the APPLICATION</i>	10,6
	<i>Formal DEVELOPMENT</i>	8,58
	SUM	43,58
Dynamis	<i>Innovative, creative CONCEPT</i>	18,6
	<i>Theoretical depth</i>	16,6
	<i>Soundness of the APPLICATION</i>	21,2
	<i>Formal DEVELOPMENT</i>	18,22
	SUM	74,62

Jury online conference meeting

The jury met online on September 26th at 3:00pm (CEST) with the main objective of evaluating all submitted projects in order to select the winning submission, as well as to award special acknowledgements. The jury adopted a critical approach to each project based on the assessment criteria, highlighting the project's strengths and weaknesses.

The outcome of the 3 hours online meeting is presented in the following paragraphs.

7-Story Pagoda

There is a beauty and balance in the 7th story pagoda that provokes a sense introspectiveness.

The jury found interesting that the driver of this project was an architectural concept. The student probably followed through the conceptual idea where the Pagoda becomes the architectural frame of different views into a landscape. And then he applied the metallic numbers to adjust the forms, size and direction.

There was a concern within the jury regarding the scale of the building and its relationship with the human figure. Some of the members would have liked to see how the human body and its scale was relatable to the design. But it was also discussed that its proportions and relation to the landscape created a majestic structure that referred to the meditative qualities that were proposed in the brief.

As with the other projects there was the question of how the mathematical diagrams related to the result and how the design decisions were made in the process. There was obviously a back and forth between the design decisions that include architectural concepts and ideas and the metallic numbers, and the jury thinks this could have been explained further graphically.

Organic urban design

The jury acknowledges the strength of the concept on a diagrammatic level. The urban layout is based on hexagons in the golden ratio, forming modular urbanization units. The pattern aims at questioning a rectangular grid structure and proposes a system of clusters. Two aspects are discussed as strong potential of the concept: On the one hand the idea of the additive structure, growing in several directions, on the other hand the application of geometrical shape, such as the hexagon on the morphology of the city, which immediately evoked references as for example Barcelona. These expectations were not sustained by the design proposal itself, which appears as simplistic and doesn't transmit a clear vision for the urban space. What is its character, what is happening on the sidewalks, what kind of urbanity is expected for the spaces between the blocks, what is the relation of blocks and courtyards? The urban spaces as proposed by the visualization are considered as problematic in relation to its use and the scale of its inhabitants. What about people, trees, cars?

The diagrammatic scheme has been directly translated into a spatial proposal, which lacks a relation between the 2-dimensional layout and the proposed block structure. The pattern is not manifested in its third dimension. The metallic numbers as a series are giving order to growth; they would support the pattern to have smaller and larger pockets, scaled up or down. Further explorations could have been taken to find a successful scale to create an urban experience. This could have been an exercise of scales in our cities.

What if the proposed pattern would be applied in very different scales? How could those be composed or superimposed, how could more dense fabric or more monumental scales interact?

The jury recommends the team of designers to pursue their investigations and to look closely at examples of existing city fabrics, which are based on geometrical shapes. The example of Barcelona has been mentioned, as the edges of the bloc correspond to the edge of the street; here the street becomes a space defined by the buildings itself. Savannah, Georgia has been brought into the discussion as example of careful consideration of proportions and a balance between built blocs and green square. Other references for productive superimposition of two systems are the Broadway, contrasting the Manhattan grid or the city layout of Washington. Looking at these' references could give a better understanding of how geometrical pattern are generative and how spaces were shaped in reality.

Bar stool

The project selected a bar stool, an everyday object, to explore the silver ratio relationship with its design. However, the exploration does not show any research to support it or a reason why the stool was selected as an example of the relationship between a piece of furniture and the metallic numbers.

As well, there is a disregard of the human proportion and its fundamental relation with the stool in terms of ergonomics, height or comfort. Would have been interesting to find explorations regarding why this is the ideal shape of the stool or how its parts were developed.

The diagram shows the silver ratio but does not explain the design. The formula shows a dynamic intention, but the gap between the concept and the final product is not resolved. The only application of the silver ratio is the outer dimensions shown only through elevations. It would have been interesting to extend the exploration to the relationship of the stool with the space.

The concept is the peacock tail feather, but the design proposal doesn't get intertwined with an exploration of the feather as such, which could have been as well an interesting proposal. The use of the colors green and purple, as well as the back of the stool are not strongly related to the design of the object as a whole. The height of the back feels randomly proposed as well as the ring where the feet are supposed to be resting. The shy hint of a spiral at the back could have been more developed into a whole theme.

Many questions remain open regarding the design decisions of the object; "What makes the slope be that height? Why should it not be higher or lower or work as an armrest."

Icosahedron pattern

This proposal could be a really good approach to the proposed issue, but is lacking development. The jury considers that there is a lot of potential in updating some other approaches to this geometry, like for example, Rudolf von Laban studies about the movement of the body and its dynamic crystallography using the icosahedron geometry. So, the relation in between this structure and the body scale in a deeper way would have been interesting to follow, also considering the mathematical relations embedded on it.

On the other hand, the use of parametric design is also a very interesting tool working with mathematics so we encourage the author to go further in this way, but with more intention and development.

Other thing to be highlighted is the construction of the prototype in itself in order to design and in order to learn through the experience but in this sense we would have expected that prototyping would have been done in series improving the starting point, creating different additions and intertwinings in between the pieces and exploring more the outcome as a matrix of mathematical combinations having spatial consequences, both at the scale of the body and at the scale of a kind of environment.

Actually, the question of scale is another one discussed by the jury thinking that it's lacking development in that direction. You see the diagram with the person there, but nobody fits comfortably inside that space, it does not work. The potential is there, you can create a space with those elements, so would be great to see a wider development of these explorations.

Another suggestion is to think the inner enclosure in relation with the body, and how you can relate with the generated surfaces. The potential of the proposal is interesting, but the lack of development left the design in a very primary state. In any case we encourage the designers to go ahead.

Stuff table

The project employs the metallic series for the design of an end table, but departs from the potential exploration prematurely in order to follow a fascination with spider webs. Although fascinating as a surface of spiraling growth and complex fractal geometry, the spider web is employed in this proposal simply as a graphic figure. The design therefore misses the opportunity to link to the spider web's mathematical attributes and structural qualities that, while unrelated to the initial study of metallic numbers, could have nevertheless informed the design in a more integral way.

While the overall proportions of the table seem to result from the application of the metallic series, no further exploration with the series was carried out in the other aspects of the table, leaving many questions unanswered regarding the diagonal plates, the largeness of the base, the thickness both of the table top and the base, among others.

The jury would like to encourage the designer to study the design more deeply in order to resolve its apparent aggregation of ideas, which seem not yet associated in concept. It is also relevant to highlight the importance of considering throughout the design process the relationship of the work to the human proportion, and to human use, which is ultimately its purpose. It is unclear on the poster how the decision is made on the initial dimension from which the design is derived, but it would benefit from being defined, explored and conveyed in relation to the human body.

Museum of Biology

The choice of program as a Museum of Biology was very compelling. The jury was drawn to the potential in this project but found it lacking in conceptual development beyond the generation of the outer shell. The study of the body, life, and the environment in Biology seem to relate to the exploration of metallic families as systems of order and growth, and imply a deep study of both the exterior and the interior of living organisms.

This aspect is lacking in this proposal and is one of the main critiques. It would have been most desirable to allow the exploration of the metallic numbers to impact the development of the interior as well, and the architecture as a whole.

The exterior of the project is very interesting with its interlocking rings, but the shell is irrelevant to what occurs inside. This disconnection, as seen in the plans and sections, weakens the actual form, as it does not define nor suggest how one enters and flows through the museum. By not exploring the spatial qualities of those rings great architectural opportunities remain latent. Some suggestions discussed by the jury include: the refined filtering of light, the possibility of people to move through the rings, the possibility for the rings to become ramps from which to experience the architecture and the city, similar to the Reichstag's dome in Berlin, or ramps that offer access to different exhibition spaces, or become themselves the exhibition spaces, not unlike the Guggenheim in New York. The structure also suggested the possibility of a retractable or kinetic roof similar to several of Calatrava's projects. There is certainly no shortage of potential architectural outcomes and the jury encourages the designer to study those further.

It is very apparent here, as well as in the other projects, how challenging the employment of metallic numbers, of metaphors, or of ideas to inspire the path to architecture is. To avoid arbitrariness the application must find resistance and constraints. The metallic numbers can generate infinite inspiring forms, like in this case the array of rings, but once generated there are actual questions of architecture that need to be resolved that can provide the needed constraints. When addressed, the constraints have the ability to press the use of the metallic numbers to create the architectural conditions that are required and desired. The architecture should not be an unquestioning prisoner to the numbers, but the numbers can instead support the development of good architecture.

Dynamis

The relationship of mathematics to design, while almost self-evident, is nevertheless difficult to define. While mathematic formulas are clear and precise, architecture, by nature and by use and through human interaction encompasses a wide range of interpretations. Each of the projects submitted revealed an exploration of mathematics as it relates to architecture and to design, some more successfully than others.

In Dynamis, the form is derived through mathematics of metallic numbers arriving at a three-dimensional spiral shape with multiple internal petals resulting in visual dynamism, hence its name Dynamis. The shape is seductive in its simplicity, clarity and beauty, though not as convincing in its proposed function. This dynamic form literally sits upon a pinpoint, one that would be very difficult to anchor were it not for a wide circular base upon which it sits without explanation. And by some magic yet to be logically explained and perhaps more surprising Dynamis is in fact a chair. By inserting a seat at a random height not related to the metallic numbers and by sheer accident a circular seat is inserted to produce a chair.

Thus, depicted as a pedestal chair, Dynamis bears little resemblance to the first pedestal chair invented in mid-20th century by Eero Saarinen, where the support and the base of the chair are molded together to create total stability. Having experimented with chairs for several years together with Charles and Ray Eames, the Tulip Chair of Saarinen was in fact quite revolutionary.

Functionally as the chair *Dynamis* has inherent contradictions. While the beauty of the form and the relationship of the parts to the whole is quite beautiful and even daring it seems precarious as a stable seat for everyday use. It is perhaps more an adventure in the mathematics of design with an unpredictable but beautiful spiral form that is sculptural rather than functional; one where scale seems somewhat irrelevant. The jury discussed its possible use for such large structures as a stadium a building, a fountain and ultimately a sculpture. It is successful and intriguing as an exploration of the possibilities proposed by playing with mathematics and design.

Prize award

It was unanimously decided that the projects which were the most successful were the following two: **7-Story Pagoda** and **Dynamis**.

The jury proceeded to vote on the winning submission, which was **Dynamis** with 4 votes in favor and 3 votes against.

The jury decided to award the submission **7-Story Pagoda** an acknowledgement.