

# Rhinozine

3D • APRIL  
2024

*The Talavera Project,  
Bridging Heritage  
& Technology for a  
Sustainable Future*

Developers Corner:  
New Script Editor  
in Rhino 8

The  
Nautilus  
Project's  
Dance between Nature  
& Computational Design

**'Unlimited Space,'** a Theatrical  
Marvel at the Intersection of  
Performing Arts and Robotics

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Image by Gijs de Zwart



6.

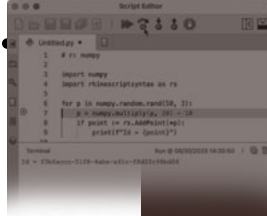
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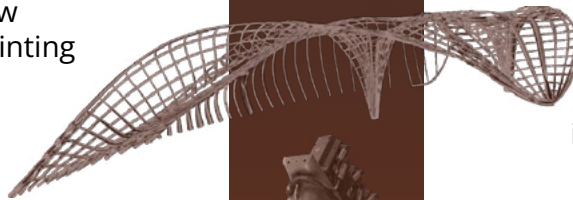
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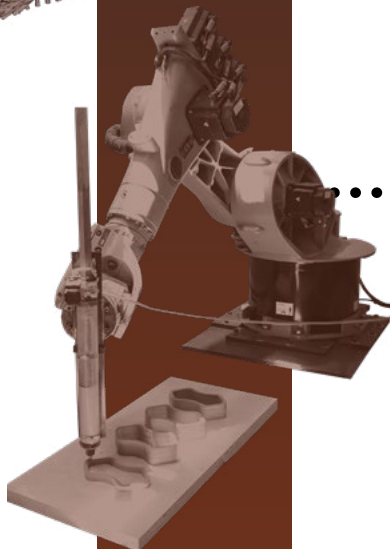
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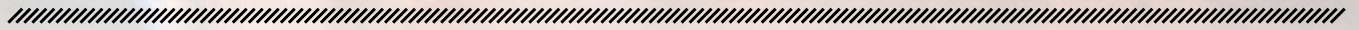


# Rhino<sup>3D</sup>zine

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Connect with fellow enthusiasts.**

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If you're eager to showcase your latest **project**, share a groundbreaking **plugin**, promote **courses** and **events**, recommend must-read **books**, or offer exciting **job opportunities**, we want to hear from you. Your expertise and insights could inspire our diverse readership!



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### Acknowledgments

- **The Talavera Project - (p. 18-20)**

**MANUFACTURA:** Dinorah Martinez Schulte - Guest Artist, Co-Founder & Project Director / Edurne Morales - Co-Founder & Computational Designer / Jared Zarate / Erick Marin

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- **'Unlimited Space' - (p. 10-11)**

Karl Singline - Computational Designer / NÜSSLI Gruppe/Neumann&MüllerVeranstaltungstechnik / Art of Entertainment / Cosmic Artists / m box bewegtbild GmbH / mo2 design / Robots in Architecture

- **The Nautilus Project - (p. 16)**

Jose Luis Perez Hermo - Architect & Computational Designer

- **'Diffusions in Architecture: Artificial Intelligence and Image Generators' (p. 21)**

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### Images

Gijs de Zwart (p. 2-3); NASA (p. 5); [food4rhino.com](#) (p. 6); Laurent Delrieu (p.7); [www.rhino3d.com](#) (p. 8); Karl Singline (p. 10-11); Mustafa Dülger (p. 12); Jose Luis Perez Hermo (p. 16); Dinorah Martinez Schulte, Arturo Arrieta, Enrique Aguilar (p. 18-20); Matias del Campo (p. 21); [simplyrhino.co.uk](#), [aectech.us](#), [events.food4rhino.com](#), [blog.rhino3d.com](#) (p. 22); NASA (p. 25).

### On the Cover

The Talavera Project by MANUFACTURA & Uriarte Talavera (p.18-20)

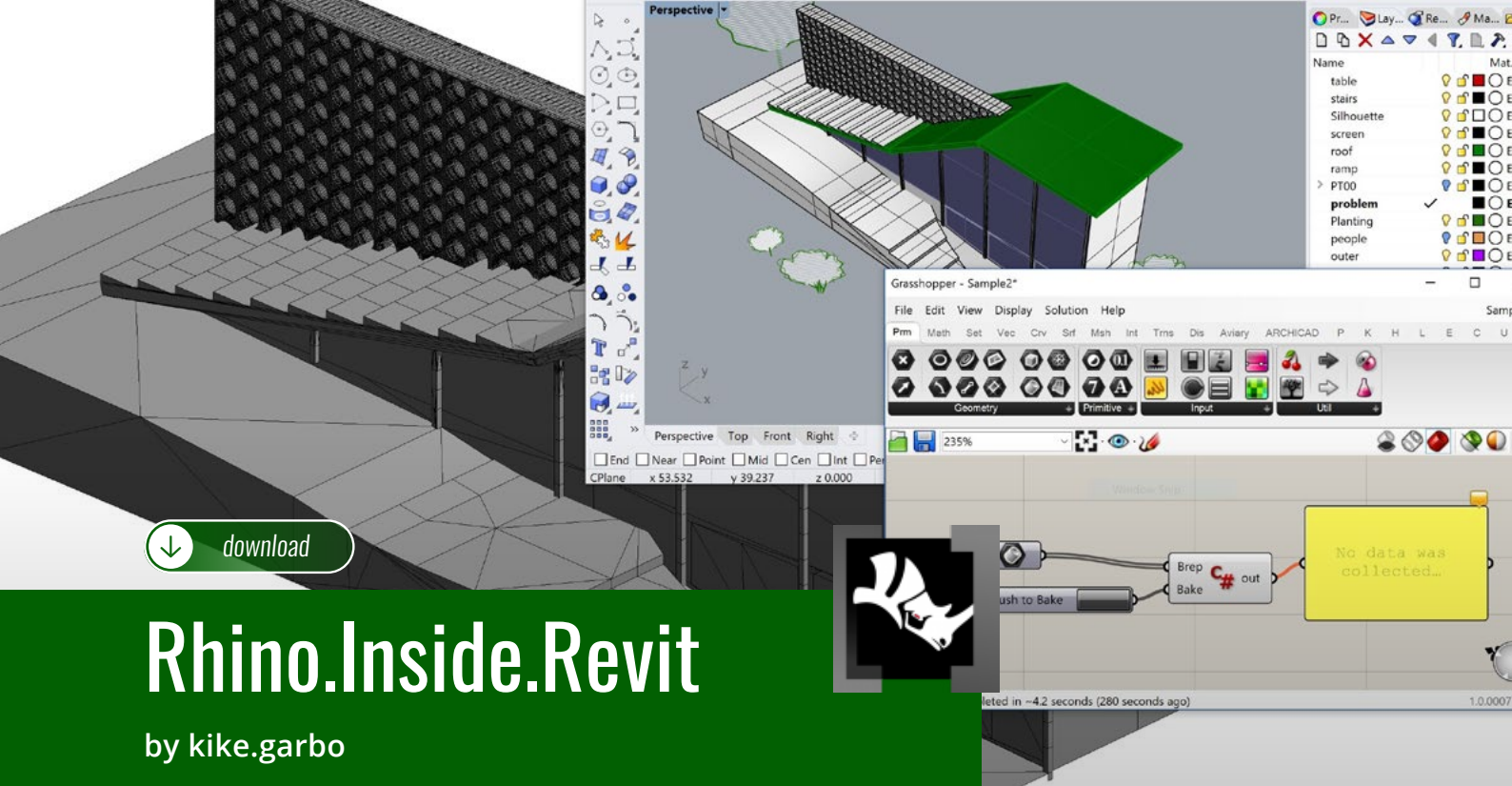
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### Corrections -





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# Rhino.Inside.Revit

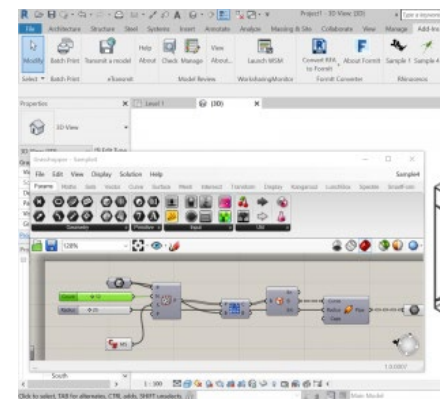
by kike.garbo

Category: Architecture, BIM, Import/Export, Programming tools

## Rhino.Inside.Revit brings the power of Rhino and Grasshopper to the Autodesk Revit® environment. *Now available for Rhino 8!*

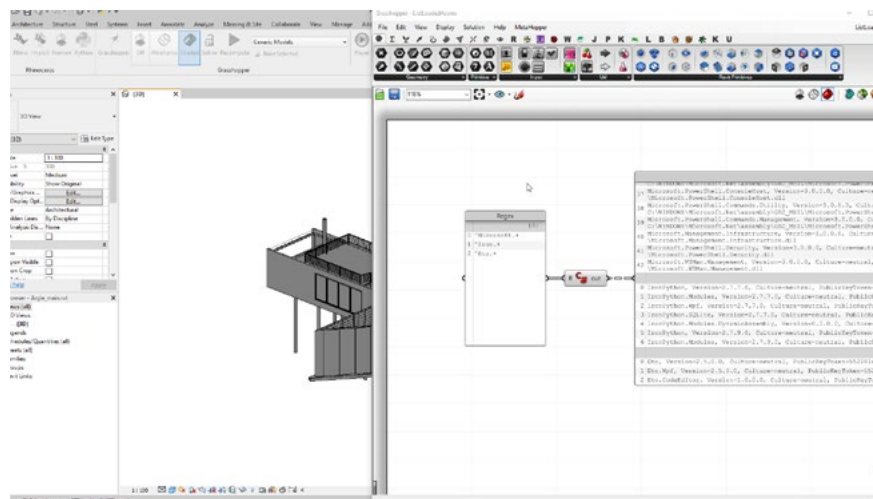
*Rhino.Inside is a technology developed by Robert McNeel & Associates that allows embedding Rhino into other applications. Rhino.Inside® is being embedded into many applications from a wide variety of disciplines.*

Rhino.Inside.Revit stands out as one of the most exciting projects within the Rhino.Inside portfolio. Serving as an add-on for Autodesk Revit®, it allows Rhino 7 & 8 to be effortlessly loaded into the memory of Revit, just like other Revit add-ons. This integration now enables smooth incorporation with all the **new features introduced in Rhino 8**, creating an unprecedented synergy between these applications.



Arguably one of the most important features of Rhino. Inside.Revit is Grasshopper. Open it by clicking on the Grasshopper button.

Rhino.Inside.Revit adds over 300 Revit-aware components to Grasshopper that can query, modify, analyze, and create native Revit elements. More components are added in each release to support more Revit native types.





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# NAUTILUS

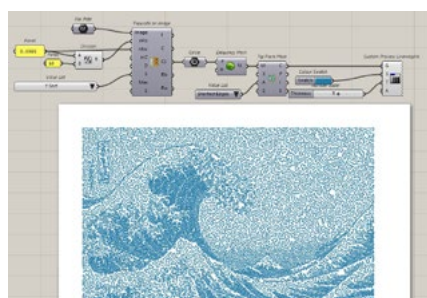
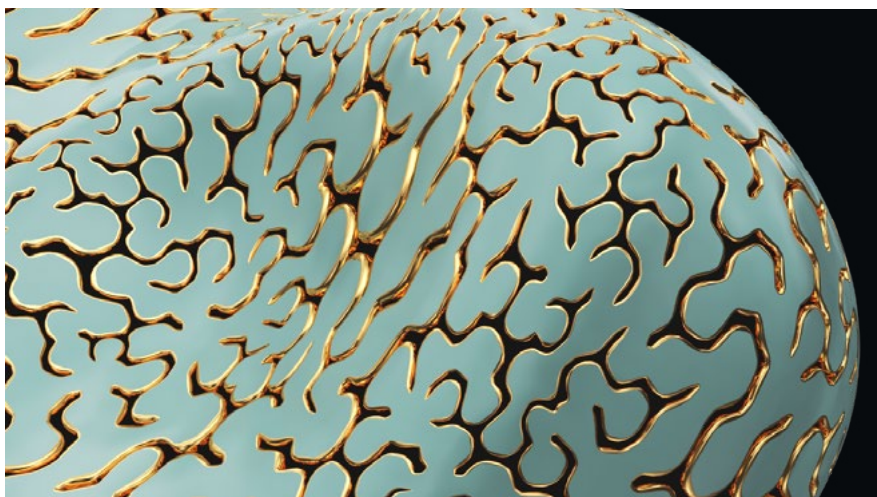
by Laurent Delrieu

Category: Architecture

**Meet the Nautilus plugin, a game-changer in 3D design. With a suite of tools covering reactions on meshes, filling curves, spirals, and customizable paths, Nautilus opens new creative dimensions.**

In the realm of reactions, Nautilus enables designers to replicate natural patterns on objects. Reaction-diffusion, for instance, mimics fish patterns and the alignment of sand dunes with the wind. Other reactions include the growth of snowflakes or the mesmerizing Belousov-Zhabotinsky reaction.

Diverse spirals, such as Archimedean, Fermat, logarithmic, or loxodrome spirals, can be effortlessly drawn using Nautilus. The tool



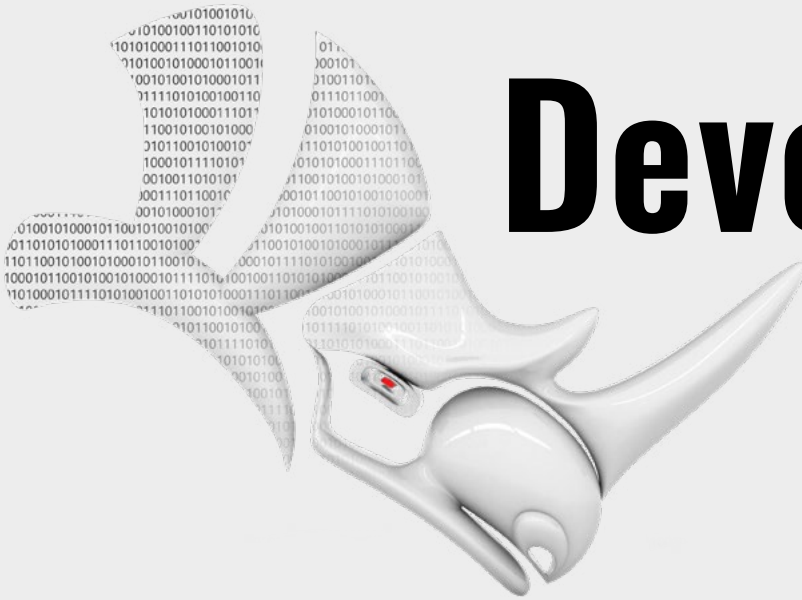
also excels in generating single closed filling curves on regions or meshes, ensuring continuous prints for faster and cleaner 3D printing. This functionality extends to artistic applications, like TSP Art, for the traveling salesperson problem.

Nautilus goes beyond, offering various paths on meshes – from

simulating water flow to more generic paths like following a vector field or performing a gradient descent or geodesic path.

Additionally, Nautilus includes other valuable tools for generating medial axes from a 2D region, crafting roofs, and generating mazes.



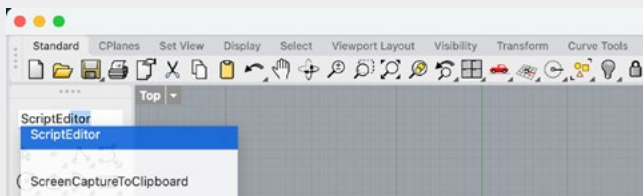


# Developers Corner

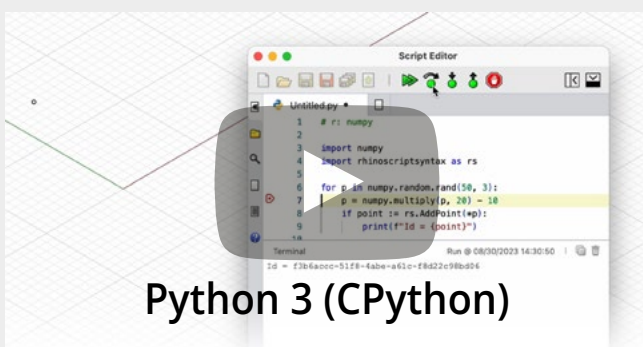
Hear it from us.

## New Script Editor in Rhino 8

Rhino 8 introduces a **revamped Script Editor** with a unified interface across Windows, Mac, and Grasshopper. This editor incorporates new line-by-line debugging and enhanced linting tools, facilitating quick code improvement and troubleshooting.



The script editor now supports CPython 3 and C#, broadening its capabilities. With CPython 3 support, thousands of modern Pypi and NuGet libraries become accessible, empowering the integration of cutting-edge technologies such as Machine Learning, AI, advanced mathematics, and web communications.



```
# requirements: numpy

import numpy

print(f"using numpy: {numpy.version.full_version}\n")

for i in numpy.random.rand(10):
    print(i)
```

Moreover, users can now create self-contained scripts specifying their required packages for effortless distribution among multiple users.

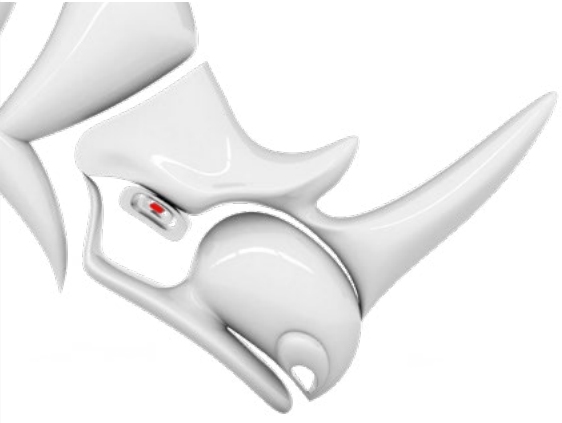


For plugin developers, the introduction of the Package Manager “yak” allows the creation of easily publishable and installable tools globally.

Stay tuned for more in-depth coverage of these features in upcoming editions of the RhinoZine.

**Sincerely,**  
**The McNeel Development Team.**





# Tips & Tricks

**Elevate Your Rhino Game:** Think you know it all? Click now and unravel a collection of game-changing tips & tricks!

The image displays the Rhino 7+ software interface with several callout boxes highlighting specific tools and their options. The callouts are:

- Orient On Surface Rhino 7+**: Callout pointing to the 'On Surface' option in the orientation menu.
- Orient Two Points Rhino 7+**: Callout pointing to the '2 Points' option in the orientation menu.
- Orient Three Points Rhino 7+**: Callout pointing to the '3 Points' option in the orientation menu.
- Orient Perpendicular to Curve Rhino 7+**: Callout pointing to the 'Perpendicular to Curve' option in the orientation menu.
- Orient Curve to Edge Rhino 7+**: Callout pointing to the 'Curve to Edge' option in the orientation menu.
- Remap to CPlane Rhino 7+**: Callout pointing to the 'Remap to CPlane' option in the orientation menu.

Each callout also includes a small icon representing the tool's function: a square on a surface, two points, three points, a square with a perpendicular line, a curve with an edge, and a square with a red arrow pointing to a plane.



# ‘Unlimited Space,’ a Theatrical Marvel at the Intersection of Performing Arts and Robotics

In a groundbreaking fusion of art, technology, and human-machine interaction, the Kazakhstan Pavilion’s Main Show at Expo 2020 in Dubai left a lasting imprint on the global stage. Led by *Karl Singline*, the project delved into the ideation, design, and production phases, showcasing the power of collaboration and cutting-edge tools like Rhino and Grasshopper.

## Ideation and Design Phase

The genesis of the Main Show was rooted in a desire to explore the delicate movements of the human hand and translate them into a captivating robotic performance. Collaborating with **Insglueck**, a creative studio specializing in media art and exhibition design, the focus evolved into a genuine dialogue between the dancer and the robot. The choreography explored themes of tension, harmony, and the blurring of boundaries between organic and artificial life.



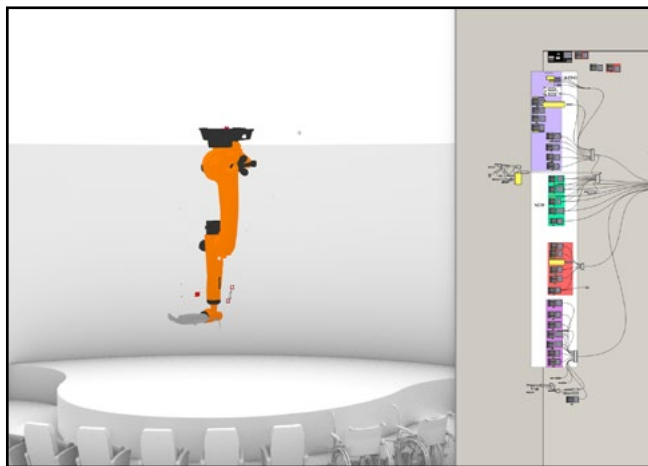


## Production Phase

Karl Singline's programming expertise was pivotal in bringing the Main Show to life. Using **Grasshopper** and **KUKA prc**, he flawlessly translated the artistic vision into precise robotic movements. The real-time feedback provided by **KUKA prc** allowed for experimentation and iteration within tight timelines. Safety was paramount, demanding meticulous programming and rigorous testing to ensure the well-being of the performer and the robot.

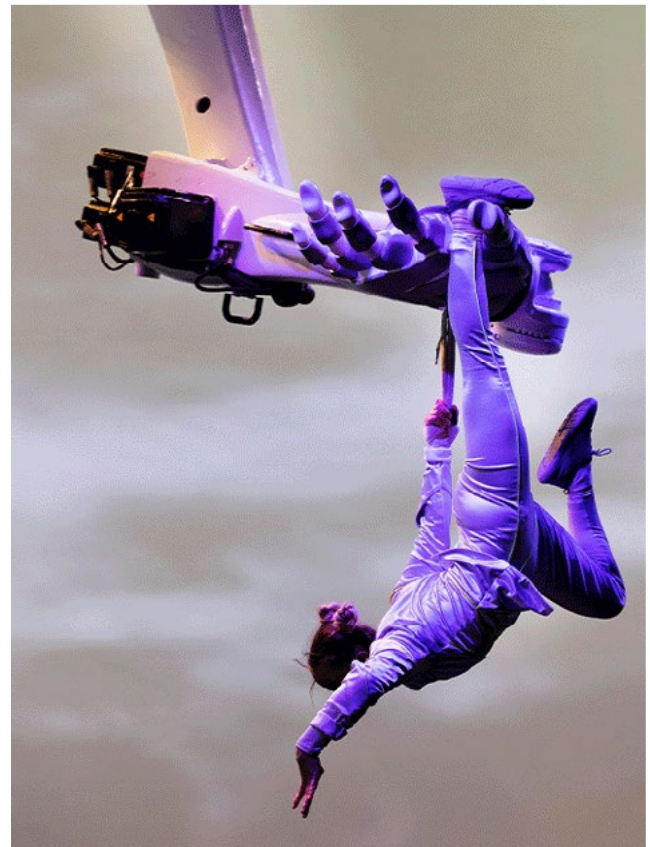


In summary, the Main Show awarded Gold in the Best Live PR Event category at the **BrandEx Awards**, was a dramaturgical highlight, presenting a visionary future where humans and machines coexist harmoniously. The collaboration between the acrobat and the intricately programmed robot hand symbolized a transition to a shared future, perfectly encapsulating the Expo's theme of "Connecting Minds, Creating the Future." The success of this project stands as a testament to the limitless possibilities when creativity, technology, and collaboration converge.



## Challenges and Strategies

The project faced challenges ensuring safety, precision, and effortless collaboration between humans and machines. However, the collaborative effort of **Insglueck**, **Nussli**, **Creative Robotics**, and **Karl Singline** resulted in an award-winning Main Show. Notably, the performance was granted the Gold Award by BrandEx in the "Best Live PR, Event" category, showcasing exceptional achievement in the convergence of arts and robotics. The use of **Grasshopper** and **KUKA prc**, among other tools, streamlined the processes, offering unparalleled flexibility and creative solutions. This prestigious recognition further underscores the groundbreaking nature of the project, exemplifying how technology and collaboration can transform the landscape of live events and performances.



# Learning



RhinoCenter® is a brand that was founded in 2015. As an official sales channel and authorized training center of Rhino 3D, developed by Robert McNeel & Associates®, RhinoCenter is giving basic and customized training along with project consultancy to industries such as Architectural Cladding, Visualization, Digital Fabrication, Jewelry Design, 3D Resin Printing with a team that has come together through the philosophy of shared network.

Embark on a learning adventure with their carefully selected courses, each designed to captivate and empower you.

## RHINO101 (Language: Turkish)

RHINO  
101

This course introduces you to the fundamentals of Rhino and modeling principles. You will learn to create, modify, transform, measure, analyze, and visualize geometry. The Rhinoceros 101 training comprises 10 lessons, providing you with the skills to confidently model your projects, generate drawings, and seamlessly transfer your files to other programs.

## SUBD101 (Language: Turkish)

SUB-D  
101

Discover the convenience of SubD for organic form research and modeling. This course covers SubD basics and integration with traditional surface modeling techniques through practical examples using two different models.

## GRASS101 (Language: Turkish)

GRASS  
101

Unlock the power of Grasshopper in this 101 training. Learn basic computational design principles and create your parametric models swiftly through applied examples, mastering algorithm creation and integration into the design process.

For more information, go to [rhinocenter.net](http://rhinocenter.net)

Or contact RhinoCenter







# Rhino 8

Rhino 8 brings new modeling tools like ShrinkWrap, a huge speed boost for Mac users, SubD Creases, PushPull workflows, better drafting tools, a more customizable User Interface, a faster Render engine, new Grasshopper data types, and much more.

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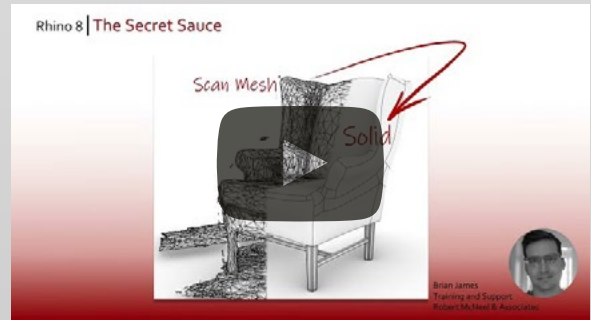
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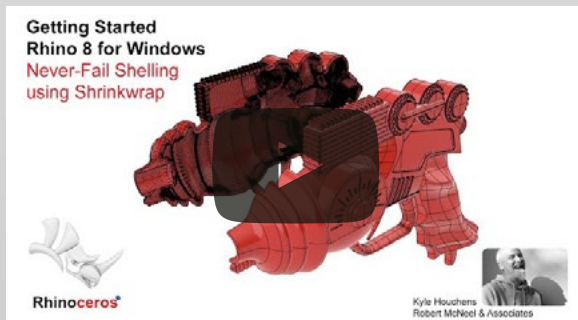
## Rhino 8 windows - never fail shelling with ShrinkWrap (new feature!)

# ShrinkWrap Tutorials



Dive into our world of free video tutorials crafted by McNeel experts, your gateway to mastering new skills!

## Rhino 8 The Secret Sauce!



Join Kyle Houchens, a McNeel technical trainer, as he unveils the transformative capabilities of Rhino 8's ShrinkWrap feature. In this tutorial, witness how this tool revolutionizes 3D printing and shelling processes, turning chaotic models into flawless prints. Follow along step-by-step to master this technique and elevate your design game. Don't miss out on this opportunity to refine your skills and create with confidence!

[Click to get started!](#)

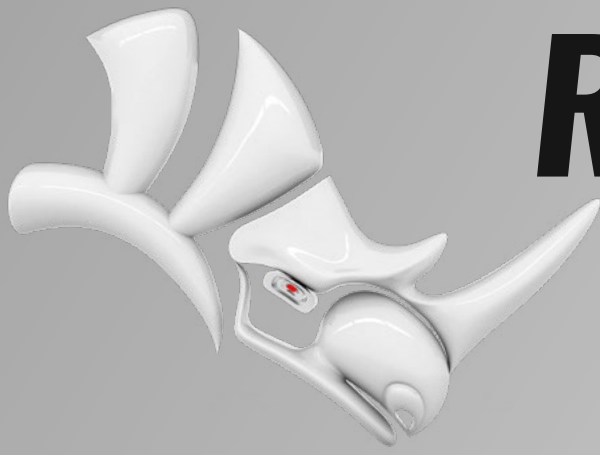
Unlock the secrets of reverse engineering in Rhino 8 with Brian James in this quick tutorial. Learn to address mesh issues, create closed solid poly surfaces, and optimize models with precision. Master the "secret sauce" workflow for fluid incorporation and manipulation. Elevate your skills and tackle complex projects confidently.

[Click to get started!](#)

**ShrinkWrap, a new feature in Rhino 8, creates a watertight mesh around open or closed meshes, NURBS geometry, SubD, and point clouds: it is ideal for creating meshes for 3D printing.**

Subscribe to our **Rhinoceros3D** YouTube channel now and **unlock a treasure trove of free tutorials**, fueling your journey to expertise and creativity!





# Rhino3D Education

with more than 30,000 students...

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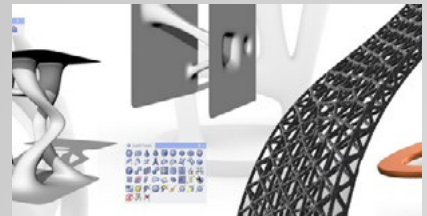
## New to Rhino?



## Rhino Intro & Intermediate



## SubD in Rhino 7



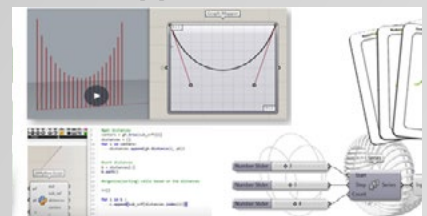
## Rhino & Revit World



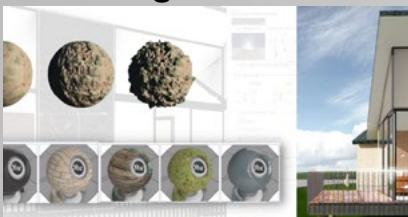
## Architecture & 2D Drafting



## Grasshopper & GH-Python



## Rendering & 3DM Blocks



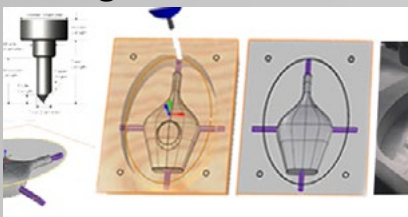
## Jewelry



## Footwear



## Digital Fabrication



## Marine Design



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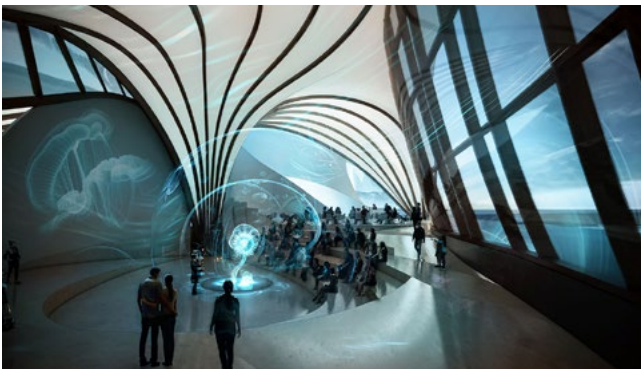


[www.Rhino3D.Education](http://www.Rhino3D.Education)

# The Nautilus Project's Dance between Nature and Computational Design

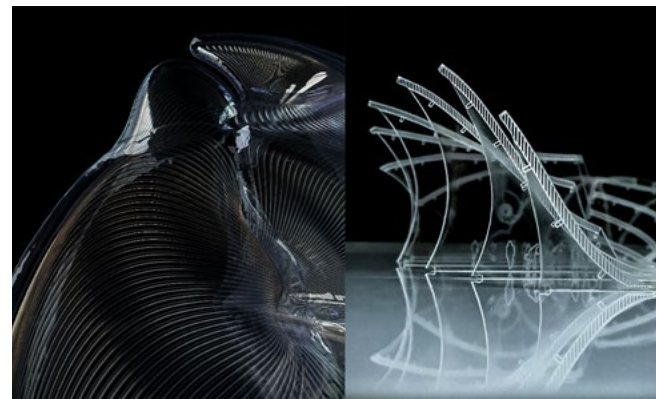
- Digital Fabricators Project

In the coastal city of Vigo, Spain, the Nautilus project by **José Luis Pérez Hermo** emerges as a captivating blend of nature-inspired architecture and cutting-edge Computational Design. The project, designed to serve as a dynamic interface between the private Marine Research Institute (IIM) and the public, symbolizes the progression of knowledge inspired by the form of a shell.



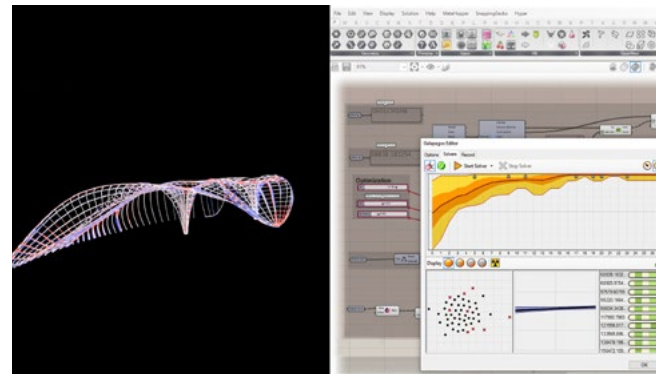
Pérez Hermo, having already been certified as an **ART**, attended the Revit Flow 2.0 workshop, where the transformative capabilities of **Rhino. Inside.Revit** became evident. This tool proved essential not only for precise geometry but also for navigating complex MEP phases. The biomimicry design, drawing inspiration from the Nautilus shell, encapsulates the essence of continuity and knowledge progression.

Throughout the project, Pérez Hermo strategically employed Computational Design tools, smoothly incorporating them into the Revit workflow. The collaboration facilitated efficient topology optimization, structural analysis, and digital fabrication, showcasing the potential of merging advanced design methodologies with architectural functionality.



Concept vs. model.

To overcome challenges, Pérez Hermo sectorized the project in Rhino, optimizing processes and effortlessly adapting to modifications. This strategic use of Computational Design tools, including Rhino Inside Revit, played a pivotal role in the project's success, allowing for the precise modeling of complex shapes.



Structural Analysis.

The Nautilus project stands as a beacon of the future, illustrating how technology and nature can harmoniously coexist in the realm of architecture. It showcases the possibilities of harmoniously incorporating advanced design methodologies into the architectural workflow, heralding a new era in the fusion of aesthetics and functionality.



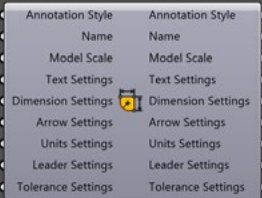


# Tips, Tricks & resources about Grasshopper

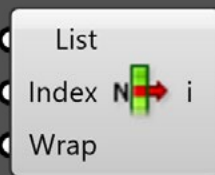
## Brep Wireframe



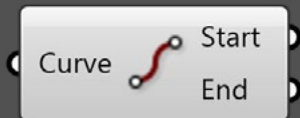
## Annotation Style



## List Item



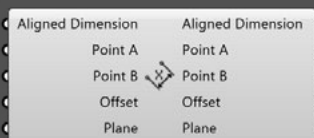
## End Points Curve



## Annotation Arrow



## Aligned Dimensions



**Elevate Your Grasshopper Game:**  
Click now and unravel a collection of  
game-changing tips & tricks!



# The Talavera Project, Bridging Heritage and Technology for a Sustainable Future

In the heart of Puebla, Mexico, the Talavera Project stands as a testament to the effortless blending of tradition and technology. Spearheaded by Dinorah Martínez Schulte and MANUFACTURA, this collaborative initiative with Uriarte Talavera, the oldest workshop in Puebla, has redefined the production of Talavera, a cherished cultural heritage. From ideation to execution, the project showcases a harmonious blend of handcrafted artistry and cutting-edge digital manufacturing techniques, with Rhino and Grasshopper playing pivotal roles in the transformative journey.

## Bridging Past and Present

The Talavera Project emerged as a response to the challenges faced by Uriarte Talavera, grappling with issues of innovation stagnation and a significant waste footprint inherent in traditional production methods. The project aimed to create a dialogue between the rich heritage of handmade craftsmanship and the possibilities offered by digital fabrication, particularly robotic 3D printing.

Drawing inspiration from the historic techniques preserved at Uriarte Talavera, the ideation and design phase became a delicate dance between tradition and innovation. Using **Rhino**, the team meticulously modeled the 3D geometry, capturing the essence of Talavera's intricate baroque style. **Grasshopper** allowed for the slicing of the geometry, optimizing the layering process crucial for 3D printing.

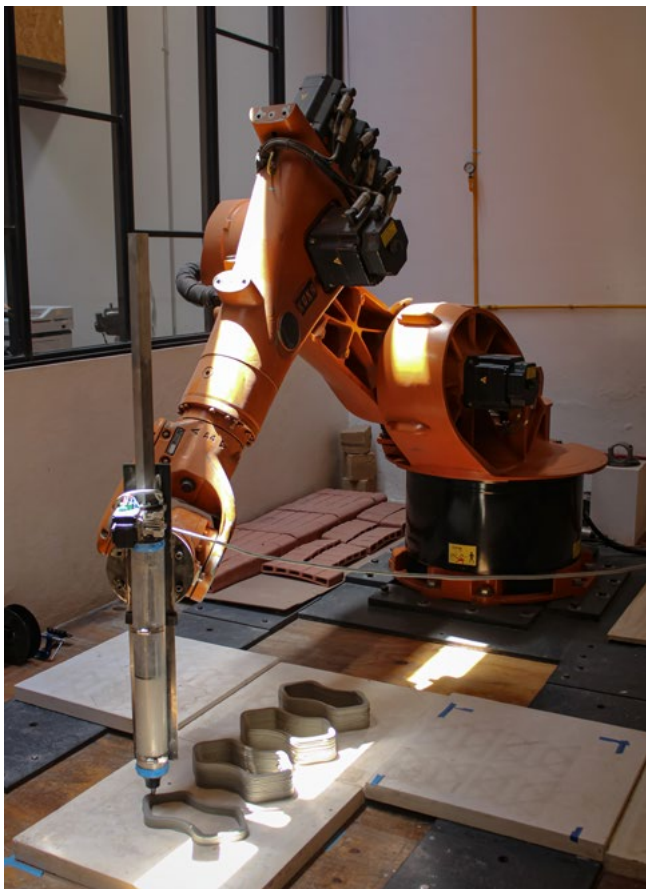


## Tools and Plugins

The Talavera Project harnessed the capabilities of Rhinoceros and Grasshopper to create a fluid workflow. The slicing process in Grasshopper enabled the generation of a parametric file for 3D printing, controlling layer thickness and optimizing the quality of the final product.



One standout tool that further streamlined the production was **KUKA prc**, a **Grasshopper** plugin. This plugin played a crucial role in communication with the **KUKA** robotics arm, converting the 3D model into a language the robot could understand (GCODE). The integration of these tools not only ensured a flawless execution of the digital manufacturing process but also allowed for a high level of parametric control, optimizing the project's efficiency.



4. **Clay Production:** Mixing black clay from Amozoc and white clay from Valsequillo, the team formed the base clay, allowing it to settle before manual molding.
5. **First Firing (Jahuete or Sancocho):** The piece underwent a low-temperature firing in a gas oven at URIARTE Talavera, indicating partial baking.
6. **Glazing and Coating:** Through immersion, the piece received glazing for traditional shine and color, using cobalt blue paint derived from natural minerals.
7. **Cobalt Blue Painting:** Applied by hand with mule hair brushes, the cobalt blue paint imparts the iconic hue, a hallmark of authentic Talavera.
8. **Final Firing:** The pieces entered a high-temperature firing to allow the glazes and paints to react, achieving the finished product.

## Production Process in 8 Steps

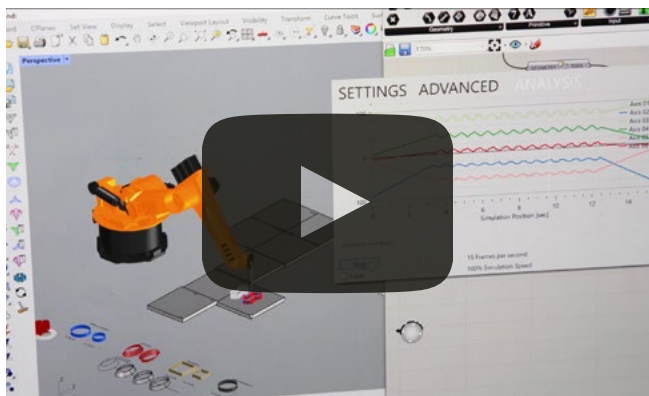
1. **Robotic 3D Printing:** Using a KUKA KR-150 robotic arm, the team employed national ceramic for 3D printing, creating a parametric file for optimized layering.
2. **High-Temperature Firing:** The 3D-printed piece underwent high-temperature firing in a specialized oven at ANFORA Studio.
3. **Handcrafted Mold Creation:** A local artisan handcrafted a gypsum mold based on the 3D-printed piece.





## Overcoming Challenges: The Intersection of Craftsmanship and Technology

The Talavera Project faced the challenge of reviving traditional craftsmanship while incorporating advanced digital manufacturing. The careful balance between these seemingly disparate elements required a deep understanding of both the artisanal process and the capabilities of digital tools.



Talavera's complex handmade production process, combined with its protected designation of origin, posed challenges in terms of cost, time, and waste. To address this, the project introduced an innovative solution—a column made from 3D-printed Talavera pieces, bridging the gap between the artisanal and the automated.



## Sustainable Practices: Tackling Environmental and Social Concerns

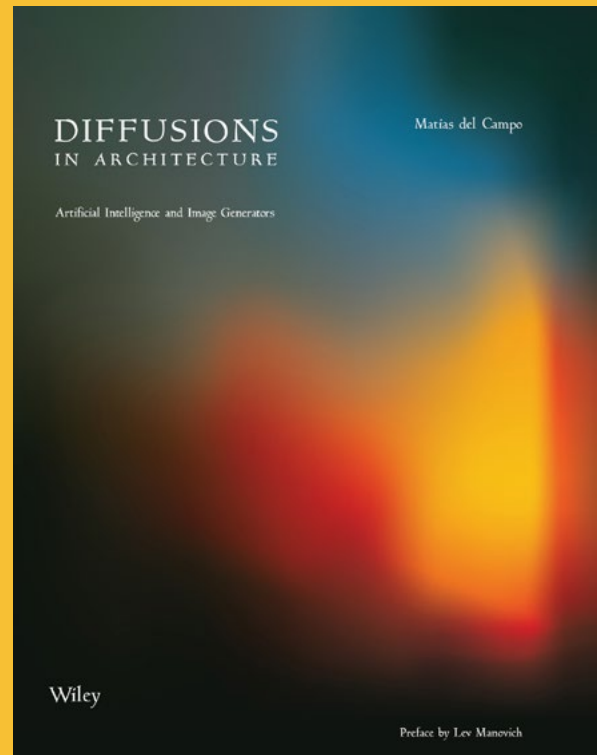
Acknowledging the environmental impact of traditional production and transport methods, the Talavera Project aimed to reshape the narrative. By utilizing digital design, robotics, and technology, the project showcased a circular approach to sustainability. Notably, the creation of an eco-friendly rug from production waste exemplifies a commitment to transforming waste into valuable, ecologically conscious products.

## A Harmonious Convergence

In conclusion, the Talavera Project exemplifies a harmonious convergence of tradition and innovation, showcasing that, in a Mexican context, distinctions between types of technology are irrelevant. Rhino and Grasshopper provided the foundation for this transformation, allowing for precision and parametric control in the intricate process.

By redefining the production of Talavera through a conscious evolution, the Talavera Project not only preserves cultural identity but also fosters opportunities for sustainable heritage preservation. In the face of global challenges, this initiative stands as a beacon, illustrating that technology and tradition can coexist, complementing each other to create a more sustainable and culturally enriched future.

# Book Discoveries



## Diffusions in Architecture: Artificial Intelligence and Image Generators by Matias del Campo

This book is a groundbreaking exploration into the transformative realm of Generative AI models, deciphering their profound impact on architectural design and aesthetics. With a focus on diffusion models like Dall-E2, Stable Diffusion, and MidJourney, the book meticulously analyzes how these artificial intelligence technologies revolutionize architectural practices, offering architects new avenues for creativity and expression.

Featuring contributions from twenty-two leading designers and theorists, the book provides a comprehensive examination of the integration of AI techniques in generative design. It explores the synthesis

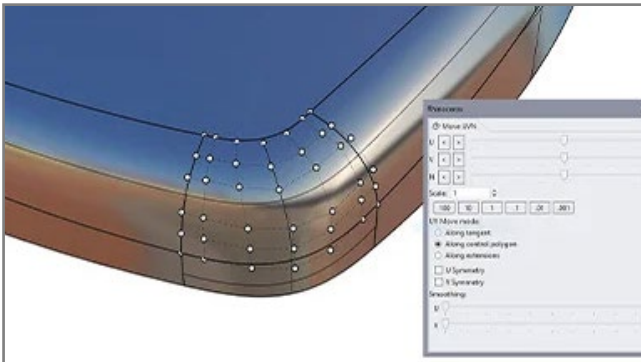
of realistic and imaginative synthetic images, showcasing the disruptive potential of AI in shaping the architectural landscape. Matias del Campo, an accomplished architect, designer, and educator, brings authority to the subject, drawing on his extensive experience and leadership in the field. "Diffusions in Architecture" promises to be an essential guide for architects, designers, and enthusiasts navigating the evolving intersection of technology and architectural innovation.





# Upcoming Events

Hone Your Skills With Rhino



## RHINO LEVEL 2 BESPOKE TRAINING

HOSTED BY SIMPLY RHINO - APR 15 2024

The experts at UK's Simply Rhino are back with another amazing course for Design and Engineering professionals. Have the basic knowledge down but looking to expand your abilities and speed within Rhino? This is the class for you.

**WHERE:** Online **TIME:** 12:30 - 5:30P (GMT)  
**COST:** £540 **LANGUAGE:** English



## AEC TECH+ BARCELONA SYMPOSIUM

HOSTED BY CORESTUDIO - APR 19-21 2024

The return of this annual four-day experience should be an exciting prospect for any and all Rhino users. A weekend of workshops (including some by McNeel), presentations, and networking opportunities awaits those able to make it to Spain this spring.

**WHERE:** Barcelona **TIME:** Varies  
**COST:** USD 100 **LANGUAGE:** English



## FOOTWEAR INNOVATION DAY

HOSTED BY AP PLASMA - APR 19, 2024

Join McNeel Asia and others in Taiwan to discover the latest development and trends in the world of footwear design, processes, and fabrication. Space is limited at this event, so make sure to register early.

**WHERE:** Taichung **TIME:** 9 AM CST  
**COST:** Free **LANGUAGE:** English/Chinese



## RHINO SUBD WORKSHOP

HOSTED BY VISUALIZATION ACADEMY - MAY 7 2024

Do you want to get to grips with new modeling tools from SubD? This geometry type enables a new approach to organic free-form surfaces and thus opens up a completely new world of creativity. A must for Rhino users!

**WHERE:** Zurich **TIME:** 8:30AM - 5:30 PM GMT  
**COST:** EUR 549 **LANGUAGE:** English



# Career Corner:

## Job Opportunities with Rhino or Grasshopper



Have a job offer or event?  
Let us know, and we'll share  
it in an upcoming issue.

### 3D CREATIVE DESIGNER FRESH

**WHO:** A global company headquartered in New York offering skincare, lip care, bodycare, and fragrance in over 25 countries.

**WHAT:** Seeking a designer to deliver visualizations and guidelines for all in-store campaigns and generate new concepts for global exhibitions and pop-ups.



### ART DIRECTOR INSTAGRAM

**WHO:** One of the world's most popular social media sites, with over a billion users worldwide.

**WHAT:** Seeking an experienced CAD designer who can concept and execute design strategies for products and brand experiences that are delightful, strategically impactful, and exhibit a high level of craft.



### PROJECT MANAGER ALL-ELECTRIC CALIFORNIA

**WHO:** A small, mission-driven construction firm, based out of San Francisco, specialized in reducing global warming emissions in existing buildings.

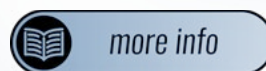
**WHAT:** Seeking an organized, detail-oriented Project Manager who will coordinate and prepare construction projects, and communicate with clients and with other team members.



### DIGITAL SCULPTOR APPLE

**WHO:** One of the world's largest and most beloved tech companies, with billions of customers and subscribers around the world.

**WHAT:** Looking for a creative personality with a passion for pursuing a career in 3D modeling. Proficiency in Rhino strongly preferred, as well as the ability to go beyond the limitations of software tools and manually manipulate or refine surfaces.



# Coupon Corner

April 5th - June 5th

Rhino3Dzine  
Exclusive Coupons



**All Courses**

Discount:  
**20%**

Coupon Code:  
**RHINO3DEDUCATION20**



**All Courses**

Discount:  
**30%**

Coupon Code: **UEIqG1Nh**

\* This coupon is limited to a maximum of 50 users.



**Training Classes**

Discount:  
**10%**

\*This coupon applies to commercial courses only.  
\*Training Classes: Rhino L1, Rhino L2, Rhino L1 for Jewellery Design, Rhino L1 for Jewellery Design, Grasshopper L1, Grasshopper L2, Rhino.Inside.Revit Course.

Coupon Code: **RhinoZine**



**Modeling 3D Jewelry  
with Rhino 7 & 8**

Discount:  
**40%**

Coupon Code:  
**JEWELRYRHIN08**

\*Coupons valid from April 5th 2024 to June 5th 2024./ \* Information and coupons provided are based on third-party collaboration and are deemed accurate. Rhino3Dzine (McNeel Miami) is not liable for any issues arising from their use. If you have any problems, please contact the provider./  
\* Unfortunately, coupon codes can't be added retrospectively. In order to receive the discount, coupon codes need to be added when prompted during the checkout process.





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**Share your work, voice your opinions, ask questions, and contribute to a supportive community.**

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