CannonDesign is an integrated global design firm that unites a dynamic team of architects, engineers, strategists, researchers, futurists, and industry specialists driven by a singular goal – to help solve our clients’ and society’s greatest challenges.
19 OFFICES WORLDWIDE
1000+ CANNONDESIGNERS
TOP 10
MOST INNOVATIVE ARCHITECTURE FIRM IN THE WORLD
#3 US Education Firm  
*Building Design + Construction*

#6 Global Health Firm  
*World Architecture 100*

#8 Science + Technology Design Firm  
*World Architecture 100*

#16 Top Design Firm  
*Architect 50*

Top 10 Innovative Arch. Firm in the World  
*Fast Company*

Top 25 Office Design Firm  
*Building Design + Construction*

Top 10 US Interiors Firm  
*Interior Design Magazine*

Top 10 Engineering Firm  
*World Architecture 100*

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500+ total design awards won in the last 15 years

900+ designers
Hilda Espinal, AIA, LEED AP+C, CDT, MCSE

Hilda Espinal is CannonDesign’s Chief Technology Officer, responsible for the evolution and implementation of the firm’s emerging technologies through leveraging computational tools and workflows, digital intelligence, immersive realities, building information modeling, and advanced building analysis and visualization. A licensed architect and technology leader for more than 16 years, she helps clients and project teams around the world leverage technology and intelligent data to make informed decisions early in the design process — reducing risk and maximizing the impact of investments.

Hilda sits on the national board of directors for Women for Economic Leadership and Development (WELD), is the chair for CannonDesign’s Diversity + Inclusion Council and is very involved in multiple partnership in the technology space. She is a Microsoft-certified systems engineer, a regularly speaker at both national and international industry events, and has been active in the Autodesk Executive Council, Builtworlds Hackathon Judges panel, Mars Home Urbanization Challenge and the AIA’s CIO/CTO Large Firm Roundtable. In 2016, Hilda was named one of the “Top Women in Technology” by the Dallas Business Journal.
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Ernesto Pacheco

VizNet is led by Ernesto Pacheco, who was recently promoted to the role of Firm Visualization Leader. In this role, Ernesto directs the development and management of digital graphic resources throughout CannonDesign for design visualization, from still renderings to animations and immersive technologies (VR, AR, XR) and promotes our capabilities to enhance visual communication and presentation deliverables.

Ernesto Pacheco leverages expert knowledge of visualization applications in supporting project teams and pursuits. As the Firm Visualization Leader at CannonDesign, Ernesto is a “Go-to” person for all project related aspects of visualization. He is primarily responsible for research and implementation of new technologies into the visual communications process. Ernesto started his career studying Architecture at the Universidad de las Americas-Puebla Mexico, before moving to the United States. He continued his studies in Interactive Design at Maryville University in St. Louis, MO. Ernesto has 18 years of experience in the Architectural field and has worked on several high-profile projects since joining CannonDesign. Most recently, Ernesto has been a key participant to the Holodeck partnership between CannonDesign and NVIDIA to develop tools geared towards Architectural Design.

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RTX AT CANNOND*SIGN
• **Quadro RTX 4000** (2,304 CUDA cores, 288 Tensor cores, 43 RTX-OPS, 8GB GPU Memory, 6 Giga Rays/Sec) NVIDIA Turing

• **Quadro RTX 5000** (3,072 CUDA cores, 384 Tensor cores, 48 RT cores, 16GB GPU Memory, 8 Giga Rays/Sec) NVIDIA Turing

• **Quadro RTX 6000** (4,608 CUDA cores, 576 Tensor cores, 72 RT cores, 24GB GPU Memory, 10 Giga Rays/Sec) NVIDIA Turing

• **Quadro GV100** (5,120 CUDA cores, 640 Tensor cores, 32GB GPU Memory, RTX ready) NVIDIA Volta
What is Ray Tracing?
We’ve come a LONG way....
1963 CGI IS BORN
Ray Casting and Path Tracing

- Arthur Appel (1968)
  - Cast rays from eye... what object is hit?

1986 Stanislaw Ulam - Path Tracing (Monte Carlo Ray Tracing)

1993 Jurassic Park – successful illusion of CGI and live action existing in the same world.

2004 Half Life 2 – High Dynamic Range Rendering – Source Engine

2018 Battlefield V
2018 RTX IS BORN
Challenge # 1

"WE NEED KILLING IMAGES TO KNOCK THE SOCKS OFF OUR CLIENTS AND BEAT THE COMPETITION"

TRANSLATION: We need game changing, state of the art output.
1. Visual Communication
1. Visual Communication
1. Visual Communication
Approach

Leverage RTX technology for denoising and real-time ray-tracing.
ANNOUNCING NVIDIA RTX TECHNOLOGY
Challenge # 2

“CAN YOU GET IT FASTER?”

Translation: Develop new workflows to expedite design decisions
Approach

Search for real-time visualization technologies.
UNREAL ENGINE

4.22 PREVIEW×4
Reflection probes and shadow buffers

Ray traced reflections and shadows
Since then...

Improved Workflows
Since then...

Improved Client Experience
What Next...

Virtualization, Simulation & AI
Ubiquitous collaboration

ONE FIRM

ABU DHABI • BALTIMORE • BOSTON • BUFFALO • CHICAGO • COLUMBUS • DALLAS • DENVER • HOUSTON • LOS ANGELES • MONTREAL • MUMBAI • NEW YORK CITY • PHOENIX • PITTSBURGH • SAN FRANCISCO • ST. LOUIS • TORONTO • WASHINGTON DC
Multi-Sensory Simulations

Physics Animations

Integrated Haptics (Thermal, Tactile, etc.)
Artificial Intelligence

Generate and Optimize Design Options

- i.e. Analysis of Line of Sight
- i.e. Travel time (as opposed to Travel Distance)
- Others?