



Search for
Extraordinary
Experiences
Division



A decade of SEED: Lessons from 10 years of R&D in Games

Colin Barré-Brisebois

Who am I?



My Path

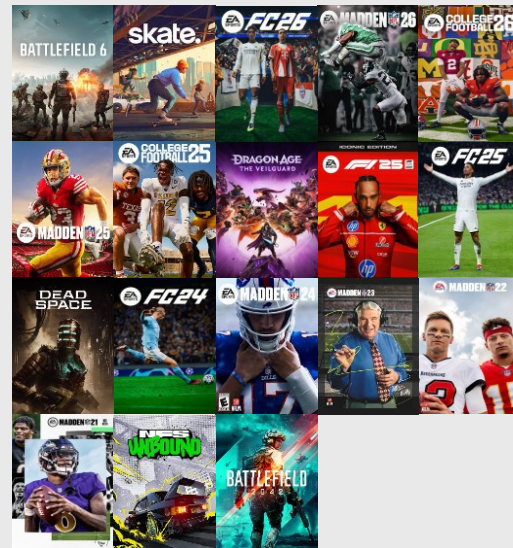
- Started at **Electronic Arts** in 2004
 - Rendering Engineer at **EA Montréal**
 - Rendering Engineer at **DICE**
- Joined **Warner Brothers** in 2011
 - Lead Rendering Engineer at **WBGM**
- Returned to EA, joined **SEED** in 2016
 - Senior Rendering Engineer
 - Head of Technology
 - General Manager

AAA games, engine, central tech, publications, and open source.

As Developer



As Central Tech Developer



SEED is a pioneering group within
Electronic Arts, combining creativity with
applied research.

We explore, build, and help define the
future of interactive entertainment.

Mission & Vision

Established in 2015 (Stockholm, Sweden)



We **explore**, **build**, and help **define** the future of interactive entertainment

Explore // R&D for The Benefit of All

Push technological boundaries, taking on risky R&D challenges for the benefit of all

Build // Empower Electronic Artists for The Benefit of Our Players

Apply R&D with measurable impact, with technology artifacts delivered in EA's games

Define // Research New Tech for Innovative Concepts to Emerge

Drive significant differentiation with high risk, high impact, high-reward applied research

Vision: *see farther than* current approaches, and identify deep and foundational technology improvements that will power the next generation of amazing experiences.



Innovation Drivers

A decade of success enabled by two razors that fuel our multi-horizon impact



Applied Innovation

Applying research to solve **real-world challenges**, sourced and delivered to game teams, at the intersection of gamedev and state-of-the-art research

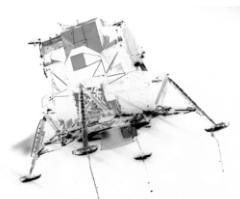


10X Thinking

Like *Moonshots Thinking*, emphasizing **exponential growth, disruptive solutions**, and **breakthrough ideas** over incremental improvements

"It's often easier to make something 10x better than it is to make it 10% better"

Astro Teller
Captain of Moonshots, Google[x]



Team

We are a cross-disciplinary, technologist-led team



**Cross-disciplinary
Art, Engineering,
& Research**

Industry Leading
Experts

Game AI, Content Creation,
Characters, Worlds,
Rendering, Physics,
Animation

**Distributed across the
World, with presence
at EA offices**

Distributed & Remote
Team of 50, at 4 core locations

Stockholm
Montréal
Vancouver
Redwood City

**Technical organization,
from top to
bottom**

Researcher-driven
Technologists across the stack

Fail-fast R&D culture
Equal-opportunity ideation
SME-led domains
Lightweight project management

Charter

Our charter includes three key areas of contributions



Research & Innovation

Drive future-looking applied research for technologies & player experiences in four key areas of innovation:

- Content Creation
- Rendering & Physics
- Game AI
- Future Experiences



Incubation & Adoption

Partner with teams across EA to productize SEED innovation, delivering technology artifacts via two avenues:

- Game Teams
- Central Teams
 - Engine
 - Tools & Tech
 - Service Teams



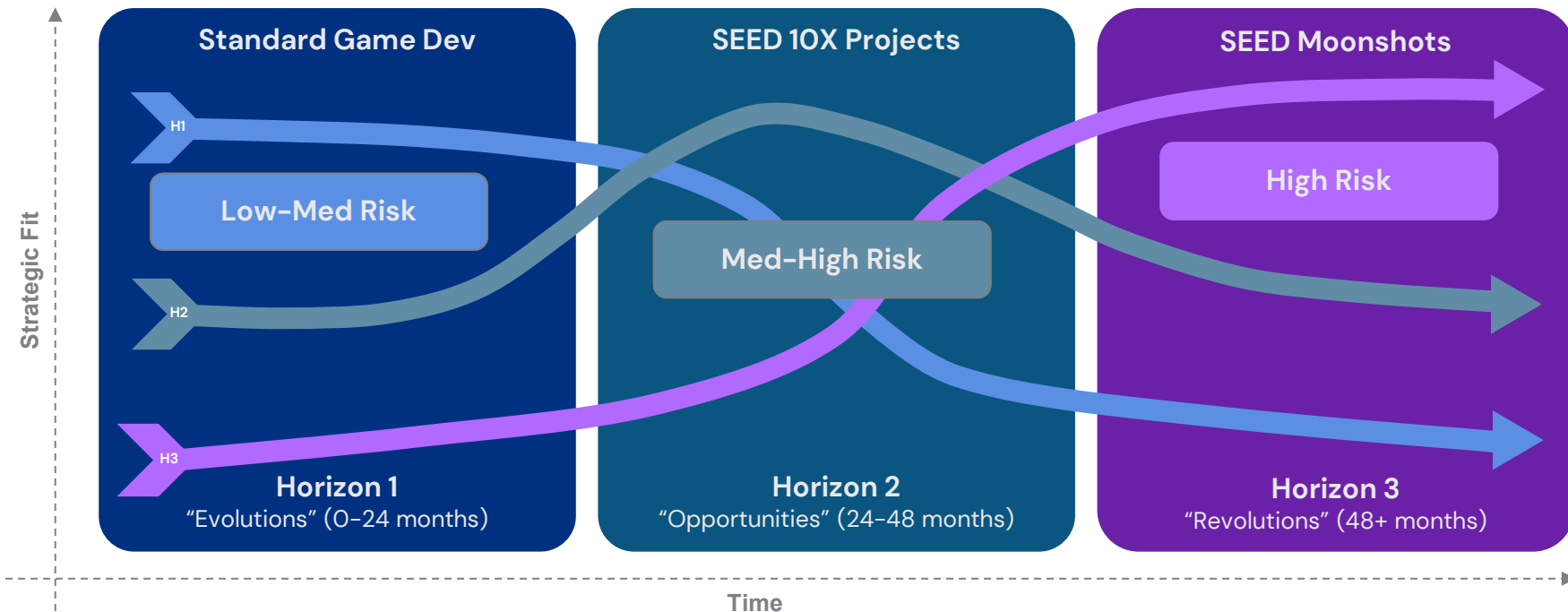
Partnerships & Dissemination

Contribute across the ecosystem, as a valued partner & thought leader via four internal/external mechanisms:

- Industrial Partners
- Research Consortiums
- Papers, Patents, Presentations
- Conference Sponsorship

Applied Research Model

Our projects are distributed over many horizons, with a focus on Horizon 2 and 3



Adapted from "[Three horizons: a pathways practice for transformation](#)" by Sharpe, Hodgson, Leicester, Lyon, and Fazey

Horizon 2/3 work in today's Games – FC26, BF6, and skate

In 2025, our work made it from the R&D workbench into EA's biggest AAA productions



Cultivating Innovation

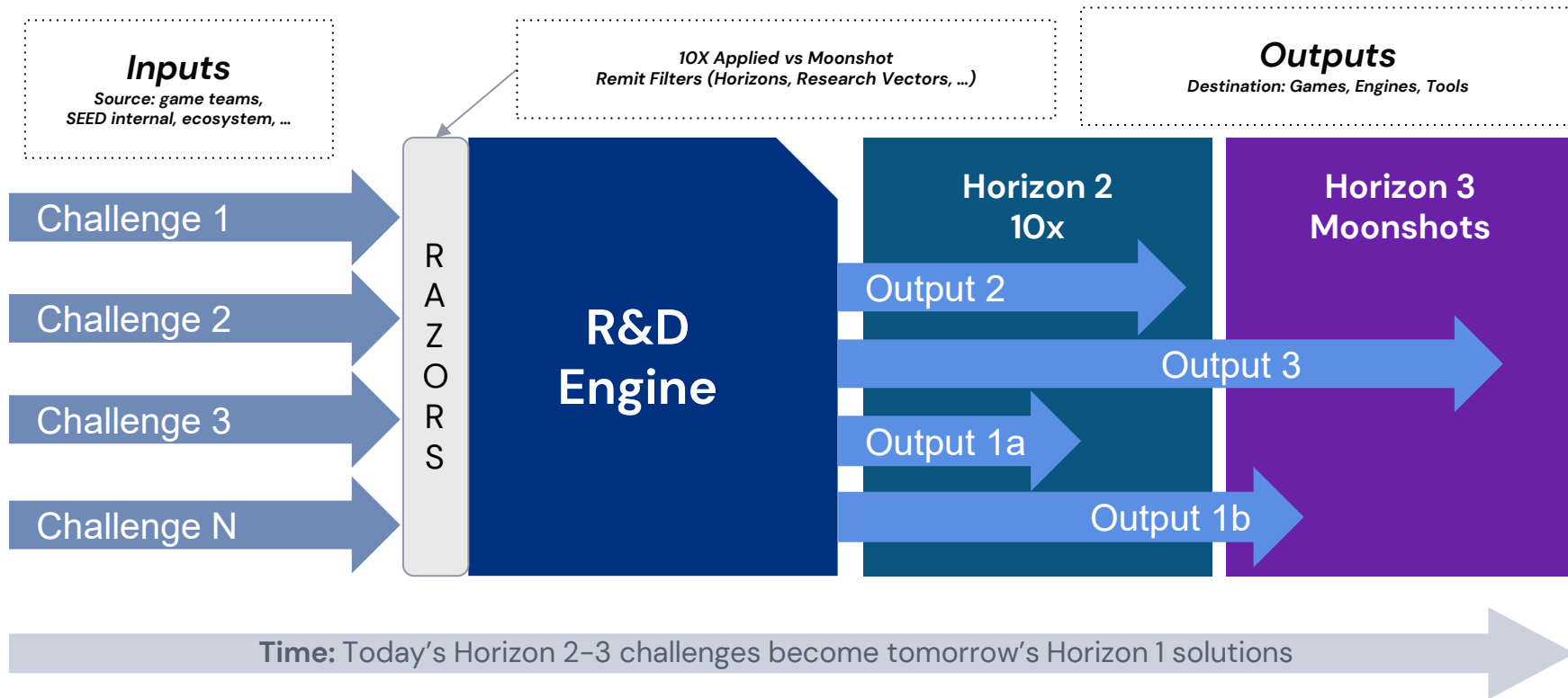
Elements of Innovation

Some key aspects that worked for us



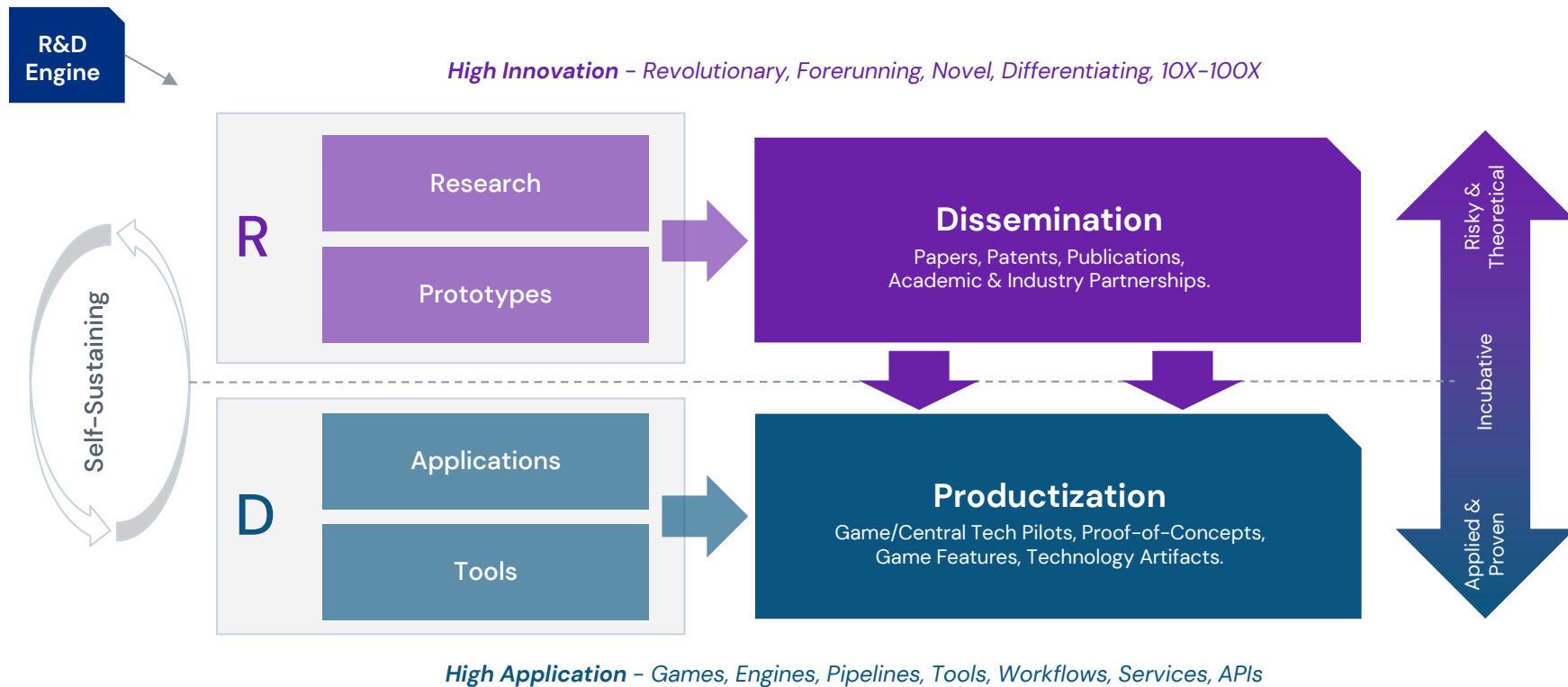
2. Define the R&D Engine

Long-term disruption, with constant influx of new challenges, while delivering measurable impact



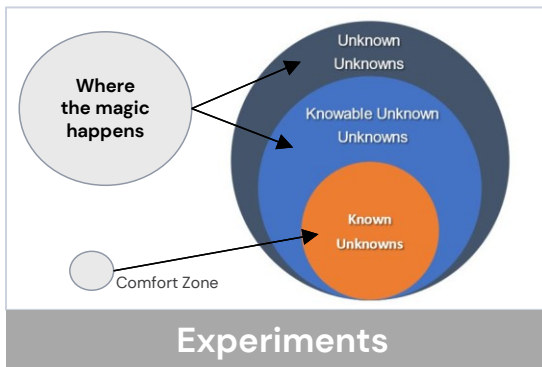
2. Define the R&D Engine

Long-term disruption, with constant influx of new challenges, while delivering measurable impact



3. Establish the Process

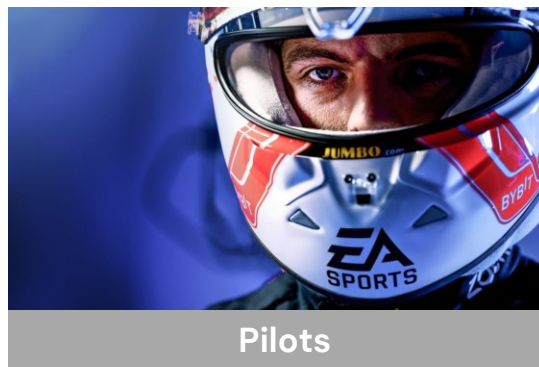
Applied research is defined around clear milestones, from uncertain outcome to proven solutions



Experiments enable exploring the Unknown, Unknown Unknowns, leading to breakthroughs.

Magic happens outside the comfort zone. The team is encouraged to initiate and supported to experiment, experiment, experiment.

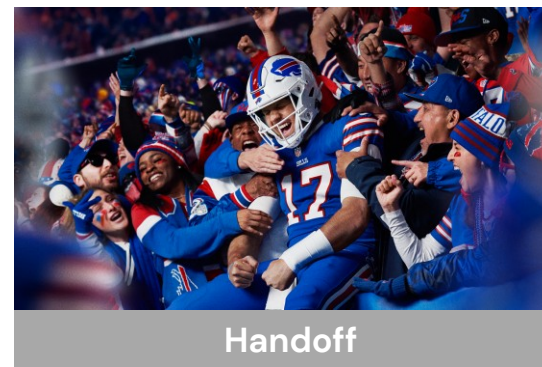
This activity is timeboxed and leads to **proof-of-concepts**, **demos**, and **tech reports**.



Pilots bring projects from the R&D workbench to the finish line in games, engines, and pipelines.

Pilots are formal contracts between SEED and the partner team. This brief defines the terms of the partnership to guarantee research delivery.

SEED team members build **prototypes** closely with the destination team and their processes.



Handoff happens when SEED and the partner team agree the work should now transition fully to the partner team.

Now 100% owned and part of another team's remit, SEED may provide support, as required.

The level of engagement and support is clearly defined and signed-off by both parties.

Formality increases as projects evolve from the R&D workbench toward productization

4. Hire the Best People

Domain experts and T-Shaped contributors



Hiring I-Shaped People

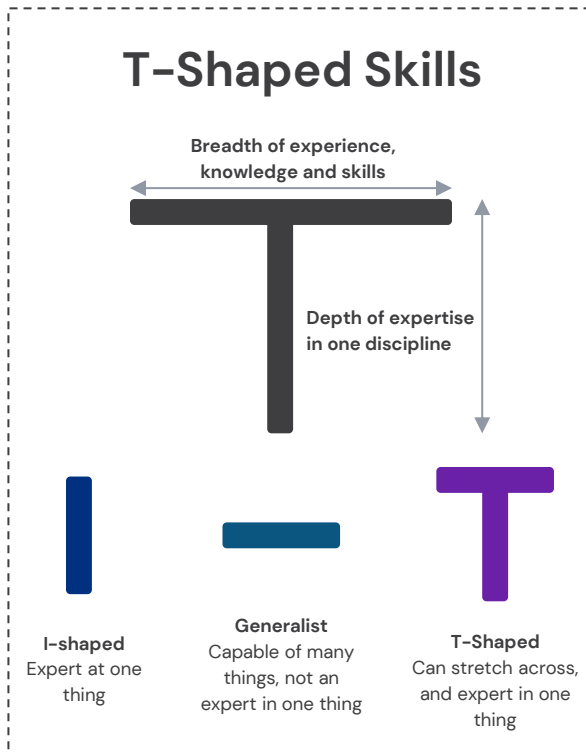
- Deep expertise within a specific domain. Bring strong mastery and focus.
- Often **early-career** or **very specialized** contributors.
- Expertise is additive, not exclusive. Need to have growth mindset, towards becoming T-Shaped: a **mindset open to expanding beyond their comfort zone**, where the real innovation happens.

Hiring T-Shaped People

- Depth in one core discipline **plus** the ability to **connect across domains**.
- Typically experienced professionals with **broad context and flexibility**.

Why Both Matter?

→ Games spans **many interconnected domains**. Success depends on a **blend of deep specialists and versatile collaborators**: people who can **push boundaries together** across expertise and creativity.



5. Establish a Culture of Innovation

On the surface, innovative cultures are generally depicted as pretty fun...



Innovative cultures are characterized by a **tolerance for failure** and **room to experiment**.

- Psychologically **safe**
- Highly **collaborative**
- **Nonhierarchical**

Research suggests these behaviors translate into better innovative performance.

In practice, hard to sustain.

To succeed long-term around experimentation, you need:

- Rigorous **discipline**
- Brutal **candor**
- A high level of individual **accountability**
- Strong **leadership**

We expect people to experiment on hard problems. We also expect them to do it sustainably.

Innovation
The Hard Truth About Innovative Cultures
Creativity can be messy. It needs discipline and management. by Gary P. Pisano
From the Magazine (January-February 2019)



Grace Chen

Harvard Business Review, 2019
<https://hbr.org/2019/01/the-hard-truth-about-innovative-cultures>

6. Create Room for Innovation

Innovation requires room for exploration, and sensible alignment with the business



- **Balance:** Seek expert advice but trust your experience.
- **Listen:** Value ideas from production teams.
- **Space:** Create room for breakthroughs.
- **Communicate:** Share work and plans clearly.
- **Manage:** Set realistic expectations and timelines.
- **Protect:** It's OK to keep early ideas until ready.
- **Action:** Document lessons; failures can lead to success.
- **Filter:** Focus on your vision and priorities.
- **Collaborate:** Innovation happens everywhere.



7. Deliver Value

Value takes many forms



Value?

- **Developer-facing:** Tools and systems that empower creators.
- **Player-facing:** Technology that directly enhances gameplay and experiences.
- **Internal knowledge:** Building expertise within the company through collaboration and documentation.
- **External influence:** Presenting at conferences, publishing papers, open-sourcing, and collaborations with partners.

Delivery requires alignment

- Ultimately, end-to-end success depends on **partnerships** across R&D, game, tools, engine, and service teams.
- **Establish clear agreements** by documenting expectations and rules of engagement.
- **Collaborate through delivery** to ensure technology reaches players and developers effectively.

More on this?

Other things that work well for us



1. Anchor projects to clear, applied goals ✓

3. Document all-the-things ✓

5. Establish several lenses to capture value ✓

2. Organize around problem spaces, not features ✓

4. Iterate quickly, then make it robust ✓

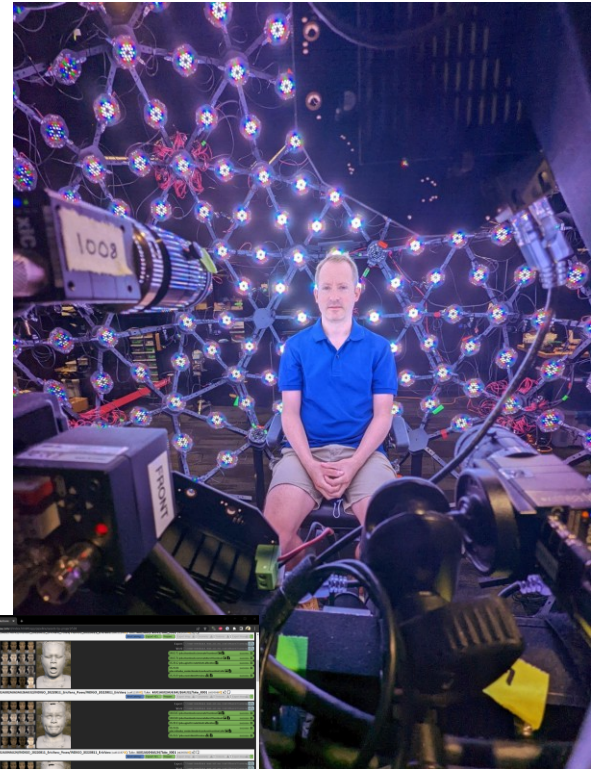
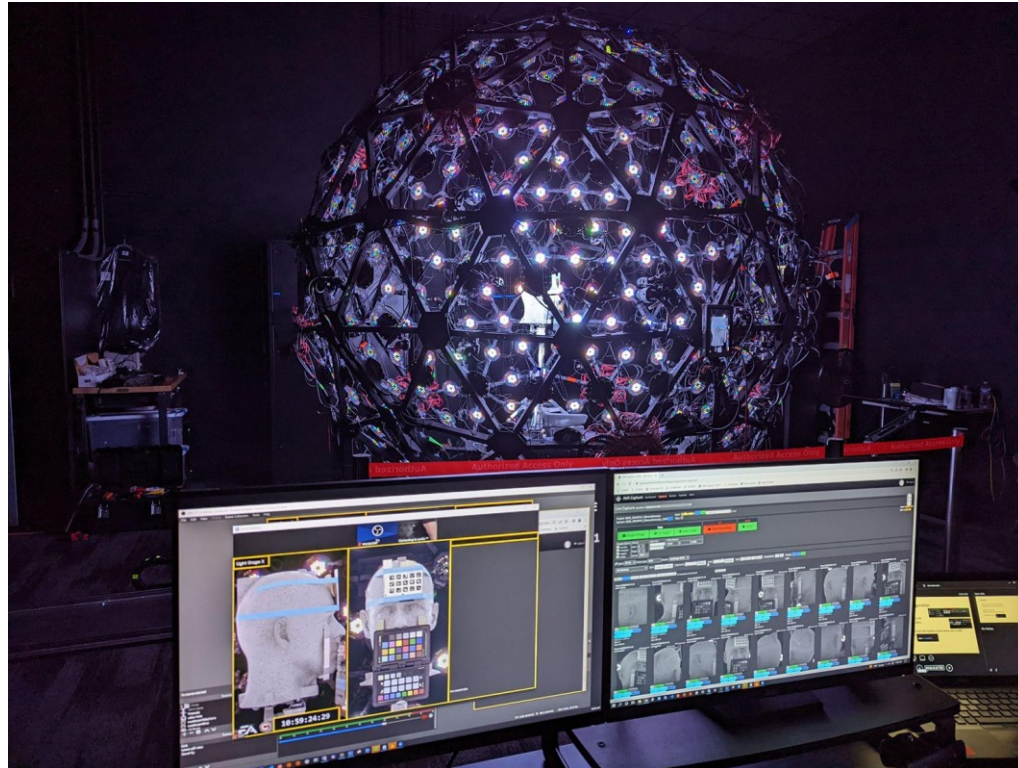
6. Demos. Demos. Demos ✓

Case Study #1

Digital Humans

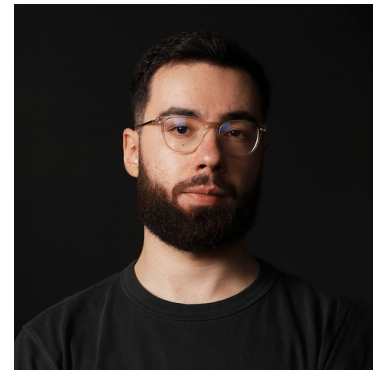
Case Study #1 – Digital Humans

From Lightstage to Frostbite, cinema-quality data enabling phenomenal characters



Case Study #1 – Digital Humans

From Lightstage to Frostbite, cinema-quality capture enabling phenomenal characters



"Lightstage was transformative for creating Battlefield's characters. It delivered cutting-edge quality with complete confidence at every step, from capture to processing, allowing us to achieve a level of photorealism that truly pushed the boundaries of what's possible in games."

Vadim Sorici
Key Character Artist
DICE

Case Study #1 – Digital Humans – Journey

From Lightstage to Frostbite, cinema-quality data enabling phenomenal characters



Origins (2017–...)

- Initially assembled, later relocated to different facility.
- COVID affected velocity on in-person hardware work.

Productization (2024–...)

- HW + SW pipeline **fully productized by 2024**.
- **Custom-built cloud pipeline** for processing and scalability.
- **Custom-built computer vision processing** for 3D/4D.
- **Upgraded HW:** cameras, lenses, polarizers, lights, cabling.
- **UL inspected**, ensuring talent safety inside the device.
- Developed in **close partnership** with **USC ICT**, **EA Capture**, **EA TnT**, and **Character Teams** across EA (including *Battlefield*).



Case Study #1 – Digital Humans – Learnings

We've learned a lot along the way



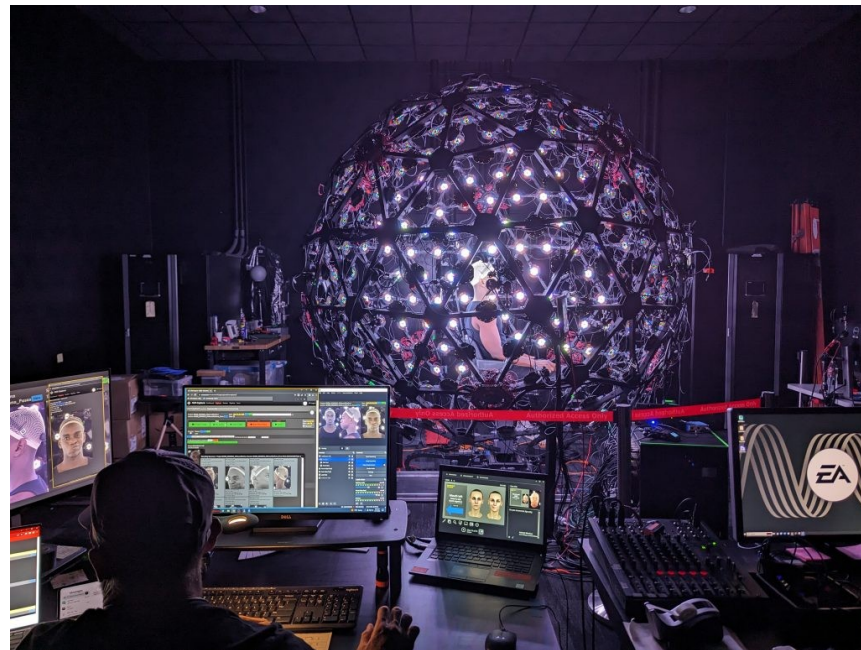
Turning R&D hardware into a product

- Productizing experimental tech involves **unexpected steps** (eg. **UL inspection** and safety certifications).
- Success comes from **tight collaboration between artists, engineers, researchers, and capture team** to bring the vision to life.

Challenges along the way

- Solving **capture inconsistencies** across subjects.
- **Distributed HW and SW collaboration** across time zones.
- **Training actors** to perform effectively inside a light dome environment.

Outcome: A major **Horizon 3 success story** now widely used across EA for our **digital human scanning** needs.



Case Study #2

Voice2Face

Case Study #2 – Voice2Face – Journey

Driving facial animation from speech

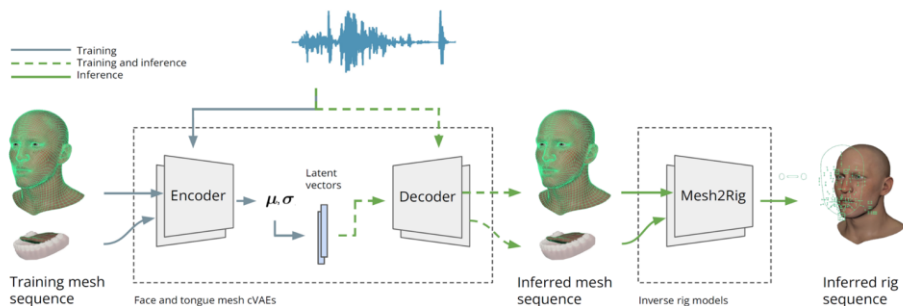


Figure 1: System overview. During training, two cVAEs are used to encode and generate facial and tongue mesh animations conditioned on speech. During inference, fixed latent vectors are used by the decoders to generate mesh animation sequences, that are then transformed into rig space via models approximating the inverse rig function.

- Lip sync model transforming **voice input into expressive facial motion**.
- Features both **offline** and **real-time** versions
 - a. Offline: used in Battlefield 6 (cinematics) and FC (chants), demonstrating scalability across genres and pipelines.
 - b. Real-time: recently presented at SIGGRAPH 2025
- **Fully integrated** within EA's ecosystem of tools.
- Drives efficiency gains for cinematic and narrative workflows, while **maintaining creative fidelity and full artistic control**.



Case Study #2 – Voice2Face – Journey

Driving facial animation using pre-recorded speech



Origins (2016–...)

- SEED's **first big ML project**, marking the beginning of our applied AI journey.
- Early experiments produced promising results quickly, but **achieving production quality and robustness demanded significant iteration**.
- Major breakthrough came from **deep investment in data**, an essential step.

Productization (2020–...)

- Began **productization** in 2020.
- Partnered with the FC team to deploy the model for **crowd chanting**.
- Shifted focus toward **centralizing the technology** through EA's Tools & Technology (TnT) teams for broader adoption, **while continuing to research the next version** of the tech.
- Developed a rig-agnostic method, enabling **seamless deployment across games** with varying facial rigs, **a key enabler for scalability**, resulting in **a company-wide offering**.



"We replaced our previous facial animation pipeline with *Voice2Face*, delivering superior, high-quality lip-synced results. After proving its value in two shipped titles, V2F now powers several major features across FC."

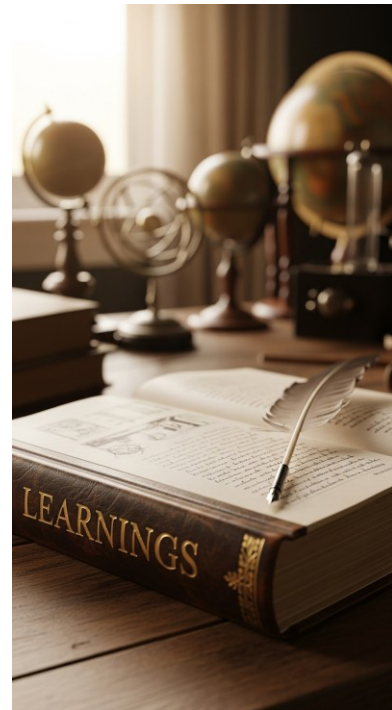
Andrew Routledge
Technical Director
FC

Case Study #2 – Voice2Face – Learnings

We've learned a lot along the way



- **Data quality is super important:** The fidelity of models directly depends on the quality and variety of data. Deep investment in data collection unlocked major quality leaps.
- **Involve creators early:** Any technology that touches creative workflows must include artists and animators from the start. Their input defines adoption.
- **Communicate capabilities clearly:** Be transparent about what the tech can and cannot do. Early versions didn't handle emotional performance well — aligning expectations built trust and guided future iterations.
- **Co-develop with artists:** Close collaboration surfaced critical insights, such as the need for accurate tongue animation, often overlooked in early models. This feedback directly influenced our research roadmap and improved realism.

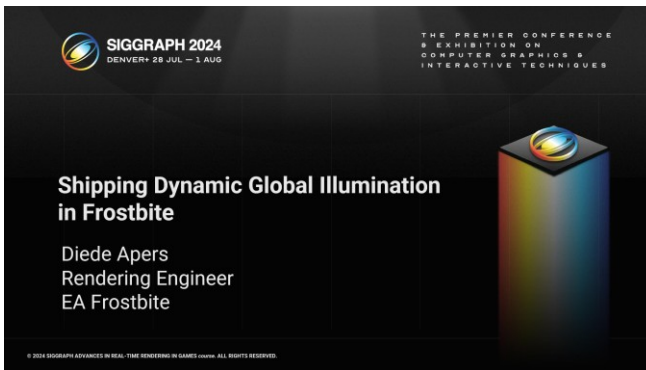
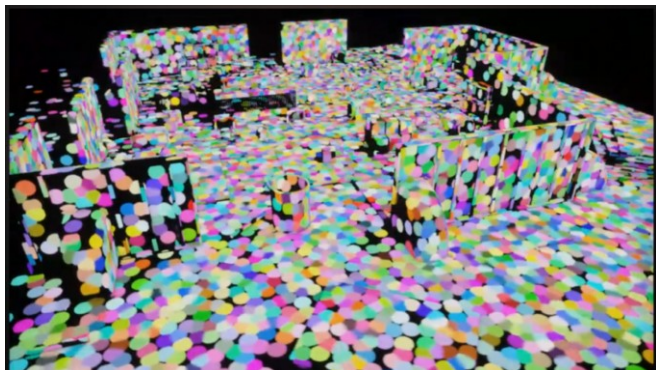
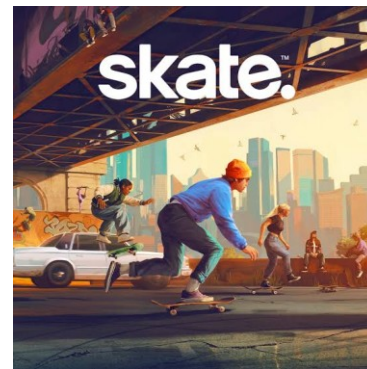
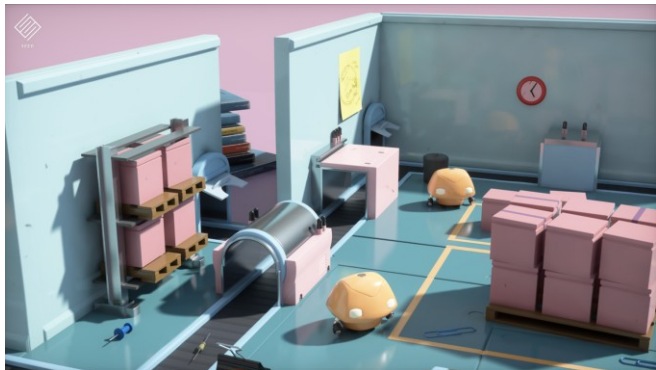


Case Study #3

Real-Time GI

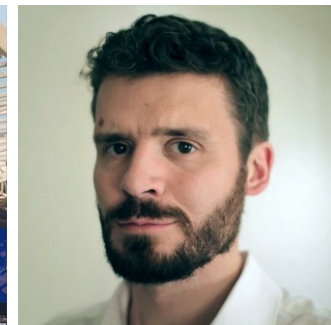
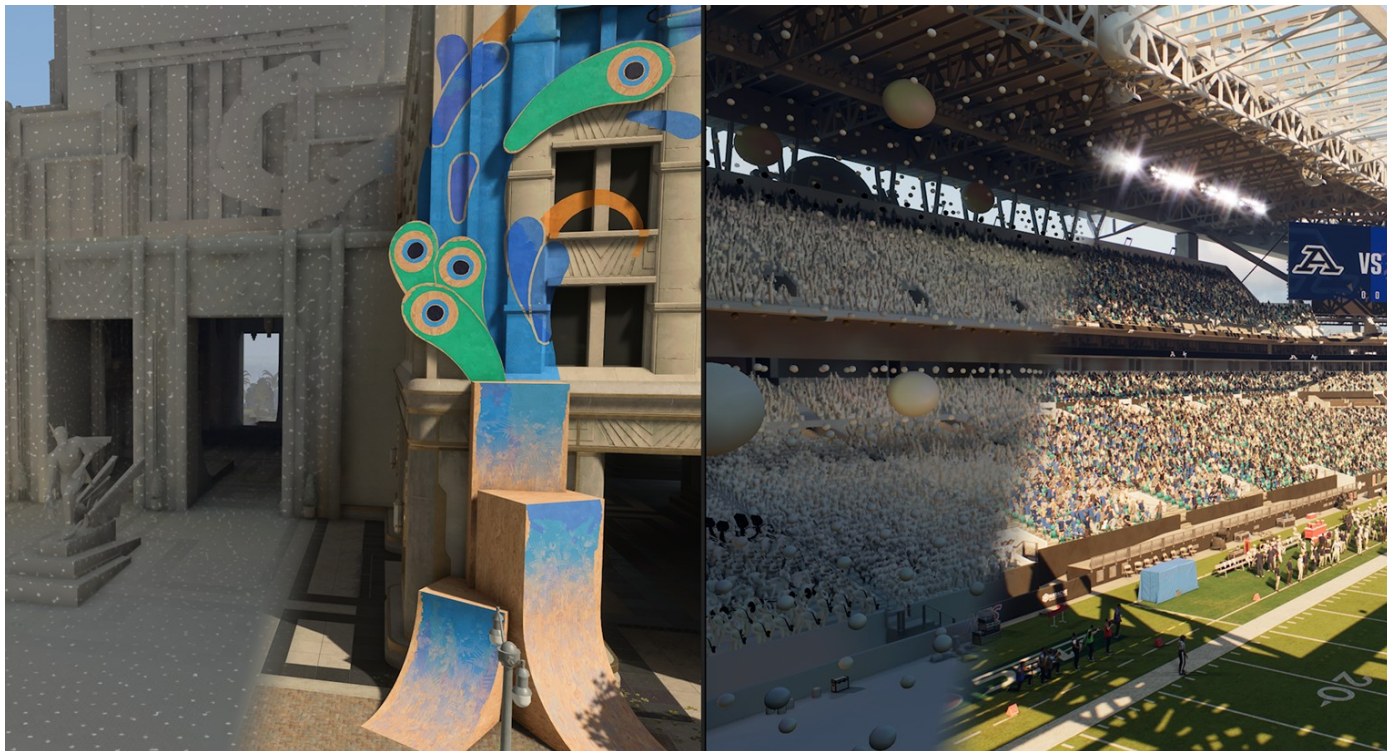
Case Study #3 – Real-Time Global Illumination

Real-Time GI has been a multi-decade challenge and dream for many



Case Study #3 – Real-Time Global Illumination

Greatly simplifies lighting workflows and enables real-time editing



"Creating even a fraction of the 150+ new stadiums in College Football 25 would've been unthinkable using previous lighting methods. GIBS unlocked a way for world builders and lighters to work together without the frustration & enormous cost of destructive & brittle baked-lighting workflows."

*Richard Burgess-Dawson
Franchise Art Director
College Football 25*

Case Study #3 – Real-Time Global Illumination – Journey

Greatly simplifies lighting workflows and enables real-time editing



Origins (2017–2018):

- Originally showcased in PICA PICA, a GDC 2018 SEED demo developed during *DirectX Raytracing* API definition and NVIDIA RTX hardware bring-up, in partnership with NVIDIA and Microsoft.

Productization (2020–...):

- Revisited to meet production needs:
 - NCAA College Football:** Enabled shipping of **150+ stadiums**.
 - skate:** Supports dynamic **open world** and UGC.
- Productized via close partnership between SEED, Frostbite, CFB and skate team.

Successfully shipped, bringing ray tracing from demo to production.



Case Study #3 – Real-Time Global Illumination – Learnings

We've learned a lot along the way



On productizing rendering tech demos:

- **Validate in the real world:** high internal confidence isn't enough — real-world scenarios reveal edge cases and performance constraints.
- **Productization is a long game:** turning advanced rendering tech into a robust, shippable feature takes time and iteration.
- **Champions matter:** a strong partner on the destination team is essential to drive adoption and alignment.
- **Secure buy-in across the stack:**
 - a. Artists: Workflow implications
 - b. Engineers: Performance considerations
 - c. Producers: Schedule impact — always plan a fallback path



Case Study #4

Game AI

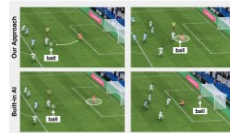
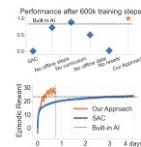
Case Study #4 – Game AI

Using reinforcement learning to train and improve goalkeeper positioning in FC26



Human-Like Goalkeeping in a Realistic Football Simulation: a Sample-Efficient Reinforcement Learning Approach

Alessandro Sestini^{1,2} Joskin Bergdahl¹ Jean-Philippe Barrette-LaPierre¹
Florian Fuchs¹ Brady Chen² Michael Jones² Linus Gisslén¹
¹ SEED - Electronic Arts, Stockholm, Sweden
² EA Sports, Vancouver, Canada
(alessandro, michael.j)@ea.com



Paper:

arxiv.org/pdf/2510.23216

Gameplay deepdive:

ea.com/games/ea-sports-fc/fc-26/news/pitch-notes-fc26-gameplay-deep-dive

Case Study #4 – Game AI – Journey

Using reinforcement learning to train and improve goalkeeper positioning in FC26



Origins (2017–2022): Reinforcement Learning in Games

- **Early Exploration (2017):** SEED began investigating reinforcement learning (RL) for gameplay, collaborating with **DICE** on experimental RL bots in *Battlefield 1*. Did not ship.
- **First Public Milestone:** Presented at **GDC 2018**, showcasing one of the first real-time RL demos in a AAA context.
- **Continuous Evolution:** Over the years, both the **field and our expertise** matured, moving from proof-of-concept to robust, scalable systems.

Productization (2023–Today)

- **Applied Collaboration:** Partnered closely with the **FC gameplay team**, aligning research innovation with production needs.

Output: shipped real-time inference for the goalkeeper, a key milestone proving that ML-driven control can meet gameplay performance and reliability



"Bringing RL to our goalkeeper system expanded the boundaries of the previous system and brought to life a more lifelike goalkeeper that matches user expectations."

Michael Jones
Senior Software Engineer
FC 26

Case Study #4 – Game AI – Learnings

Using reinforcement learning to train and improve goalkeeper positioning in FC26



Learnings – Reinforcement Learning in Games

- **Productization is a journey:** Turning experimental ML research into a production-ready system **takes time, iteration, and persistence** — similar to our work in rendering and digital humans.
- **Respect the craft:** Game teams are rightly protective of gameplay AI — it's core to the experience. **Building trust and proving reliability** is essential.
- **From research to robustness:** ML-driven systems introduce new kinds of uncertainty. Success comes from methodically **validating, stabilizing, and hardening** these behaviors over many iterations.
- **Champions drive adoption:** A strong partner on the destination team is **critical to align innovation** with product vision and, ultimately, ship for maximal impact.
- **Collaboration is key:** This effort would not have been possible without our ML researchers working closely with the FC team, daily, in their code base.



Wrapping-up

Conclusions

It's been 10 years. And we're just getting started.

R&D is hard — but when it works, the payoff is extraordinary.

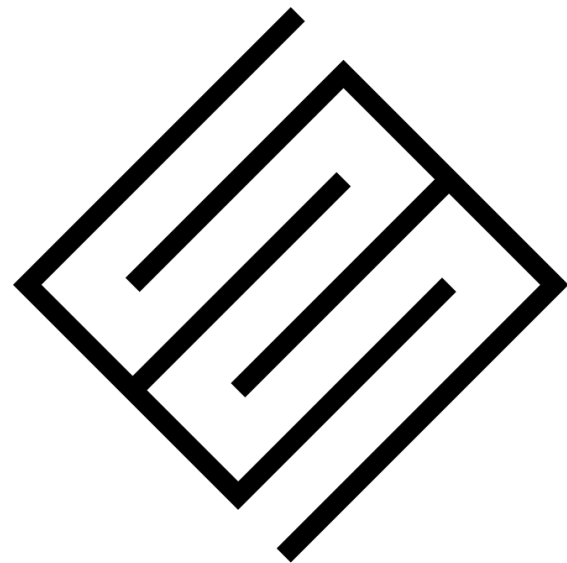
Bringing R&D from the workbench to production takes the right people across the stack — engineers, artists, researchers, producers, and management, aligned around shared goals of innovation.

Building an effective self-feeding R&D engine takes time: finding balance between future-looking exploration, calculated risk-taking, and continuously delivering value for the business (while exploration continues).

We've found that sweet spot, but it didn't happen overnight. It's the result of persistence, iteration, partnership, and collaborative spirit. This would not have been possible without partners across EA.

Ultimately, it's all about the people, the ideas, the space to innovate, and the storytelling.

We hope this inspires you — and gives you ideas for your own R&D journey.



S E E D



SEED - Celebrating 10 years - Established Nov 5th 2015



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seed.ea.com

**We're changing
the game.
Join us!**

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Physics, Animation.

Games, Engine, Central Tech, Applied Research

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