

# Sean Cier

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## Experience

### Zillow [Rich Media & AI] · Senior Principal Engineer · 2019 → Present

Officially the mobile architect and unofficially the science/engineering bridge in Zillow's Rich Media group. I specialize in 0->1 innovation, spending part of my time creating prototypes and working with leadership to shepherd them into shipping products, and part coordinating and advising across a half-dozen teams. Some of the efforts I'm most proud of include:

- **SkyTour**, one of the first production-scale uses of 3D Gaussian Splats. What began as a collaboration with a scientist, creating a 3DGS renderer from scratch and selling this unique capability in VR to C-level execs, grew to a project spanning 20+ and ultimately shipped a powerful immersive experience to let home buyers understand a home exterior as though they're flying a drone.
- **Zillow Immerse**, a unique AR experience reimagining virtual touring and home shopping on Apple's Vision Pro. I drove this concept and assembled a scrappy team of engineers and together delivered an app on Day 1 of the Vision Pro, which was featured on the App Store, throughout the press, and was even still being featured in Apple's WWDC keynote 1.5 years later.
- Leading efforts to drive Zillow's virtual tour and floor plan creation from a centralized tool to an automated on-device capability, utilizing CV and ML to reduce HitL costs, shorten SLAs, improve scaling, reduce vendor dependencies, and improve quality by providing immediate interactive feedback and control to photographers. The first feature on this track, On-Device Panorama Stitching, I delivered just before Covid, allowing Zillow to scale to meet the sudden increase in demand for virtual tour experiences, and led to the creation of a team specifically targeted at delivering further On-Device features.

### Apple [Maps] · ICT5 · 2015 → 2019

- Map Client on iPhone, iPad, CarPlay: search; 3D indoor venues; community
- Created the prototype that became AR Walking Directions, one of Apple's first consumer-facing AR features

## **Amazon [Mobile Shopping] · SDE-III · 2010 → 2015**

- Led Amazon Shopping app team for iPhone and iPad. Evolved the app from a monolithic app to a scalable platform for multiple teams across Amazon to contribute features to a seamless user experience.
- Part of App Works, a skunkworks team prototyping new approaches to mobile shopping. Led multiple unreleased prototypes, as well as Amazon Santa from conception through production launch; collaborated on Price Check, Amazon Deals, and MYHABIT

## **Parabon · Software Architect · 1999 → 2001 + 2007 → 2010**

Helped create Parabon's Frontier platform for massively distributed computing using idle computing resources across the internet and within enterprises

- Defined the SDK and client/server communication protocols
- Helped architect and implement the scalable and fault-tolerant servers to coordinate task distribution, scheduling, and node management
- Implemented several client applications, including photorealistic rendering based on the Metropolis monte carlo light transport algorithm, using a novel approach to improving median throughput and reducing the impact of high-latency nodes

## **ProLogic (now Ultra Electronics) · Senior Engineer · 2002 → 2007**

- Co-lead on Force Protection Planner, using satellite and photographic images collected on site to create a 3D building model for threat analysis and visualization, utilizing an innovative images-based-modelling approach
- Led a team working on systems and contract proposals for border protection, visualization, and optimization
- Conducted on-site training

## **Autometric (now Boeing) · Lead Software Engineer · 1997 → 1999**

- Co-lead on MFVR (Mission Familiarization VR), which created innovative image-based modelling and rendering approaches to serve as the basis of a free-roaming building photorealistic 3D building interior model, for site familiarization for rescue operations

## Independent Projects

**MetalSplatter** · Open Source · visionOS, iOS · Swift, Metal, SwiftUI

Library for rendering immersive 3D Gaussian Splats (3DGS) on Apple platforms

Also, a visionOS app for viewing 3DGS scenes in VR/AR, launched day one on Vision Pro

**Submerged** · iOS · Objective C, OpenGL ES

An iPhone app to use a dynamic physics-based system to distort the realtime camera feed using both device motion (IMU) and touch interaction, to make it look as though you're underwater

**Subatomic** · iOS · Objective C, OpenGL ES

An iPhone/iPad game where the user has to use attractive/repulsive forces driven by user touch to direct glowing particles through dynamic physics-based hazards and into matching goals

**XPilot** · Open Source · iOS · C++, Objective C, OpenGL ES, UIKit

An iPhone/iPad port of the groundbreaking online multiplayer UNIX/X/OpenGL space shooter game

**RenderMan Java bindings** · Open Source · Java

Open Source to read and write RIB files and implement Pixar's RenderMan API for PRMan integration from Java apps.

## Education

**Carnegie Mellon University** · Pittsburgh, PA · 1994 → 1998

Bachelor of Science, Computer Science

Bachelor of Science, Physics

# Patents

Automated Generation And Presentation Of Building Floor Plans With Associated Absolute Locations Using Surrounding Real-World Data

*US 20250086334 A1 · Zillow · Filed Oct 9, 2023*

Automated Generation Of Building Floor Plans Having Associated Absolute Locations Using Coordination Of Multiple Data Sets

*US 20250190640 A1 · Zillow · Filed Sep 7, 2023*

Automated Tracking Of In-Building Device Location And Provision Of Associated Location-Related Functionality

*US 20240251378 A1 · Zillow · Filed Jan 23, 2023*

Automated Localization Using Beacon Transmitter Devices Of Data Acquired In Buildings

*US 20240233260 A1 · Zillow · Filed Jan 5, 2023*

Automated Determination of Image Acquisition Locations in Building Interiors Using Multiple Data Capture Devices

*US 11,252,329 B1 · Zillow · Issued Feb 15, 2022*

Automated Generation On Mobile Devices Of Panorama Images For Building Locations And Subsequent Use

*US 2021/0385378 A1 · Zillow · Filed Apr 28, 2021*

Mobile device navigation system

*US 2021/0092555 A1 · Apple · Issued Aug 9, 2022*

Assisted Shopping

*US 8,630,851 · Amazon · Issued Jan 14, 2014*

System and method for the establishment and the utilization of networked idle computational processing power

*US 6,463,457 · Parabon · Issued Oct 8, 2002*