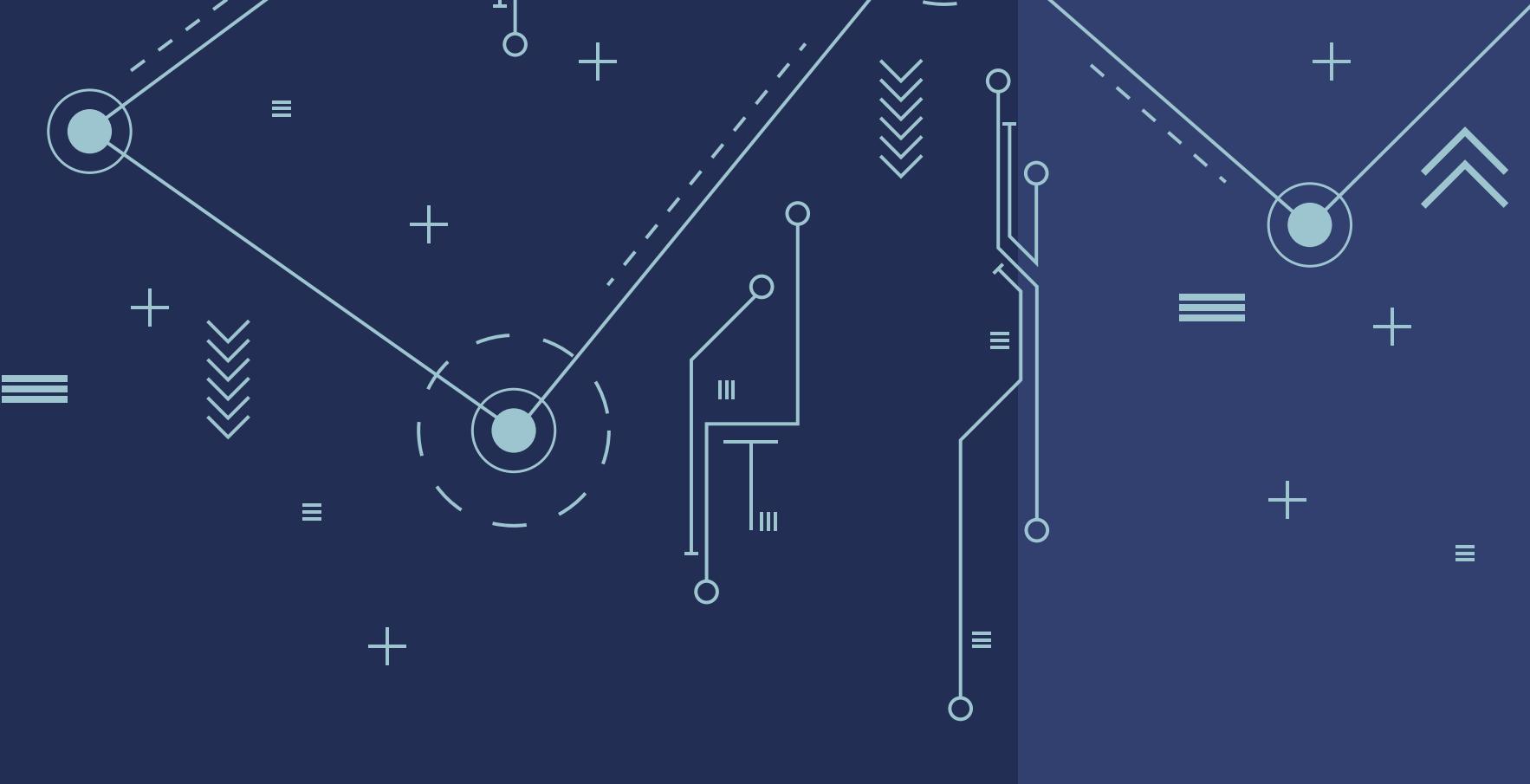


# WebGL

DANIEL BUSARELLO





**K H R O N O S®**  
GROUP

## Sobre o WebGL



Baseado em OpenGL ES

API de gráficos 3D de baixo nível



JavaScript

Utilizando o elemento Canva do HTML5

# 3D Voxel Airplane



# The "Hybrid Graph"

The screenshot displays the "Hybrid Graph" interface, which integrates a graph-based editor, GLSL code editor, and a rendering preview.

**Graph Editor:** The top half shows a directed graph with nodes represented by circles and edges by arrows. Nodes include mathematical operators like '+', '=', and ' $\equiv$ ', and symbols like ' $\vdash$ ' and ' $\dashv$ '. A node labeled 'III' is also present.

**GLSL Editor:** The left side features a grid-based layout for defining uniforms and properties. It includes sections for:

- Uniforms:** speed (float), brightnessX (float), permutations (float), iterations (float), uvScale (vector2), color1 (vector3), color2 (vector3), and color3 (vector3).
- Properties:** Physical Properties (FRAG) and Output (FRAG). The Physical Properties section lists various material parameters like Color, Normal Map, Metalness, Roughness, etc. The Output section lists Position, Color, and other output types.
- Purple Metal (FRAG):** A specific material configuration with uniforms for time, permutations, iterations, uvScale, color1, color2, color3, brightnessX, and speed.

**Preview Window:** The right side shows a 3D rendering of a torus knot with a purple, iridescent, and metallic texture. The interface includes dropdown menus for Engine (Three.js), Select an example! (None), Lighting (Single Point Light), and Model (Torus Knot). It also includes checkboxes for Lighting Helpers and Animate, and settings for Background (None).

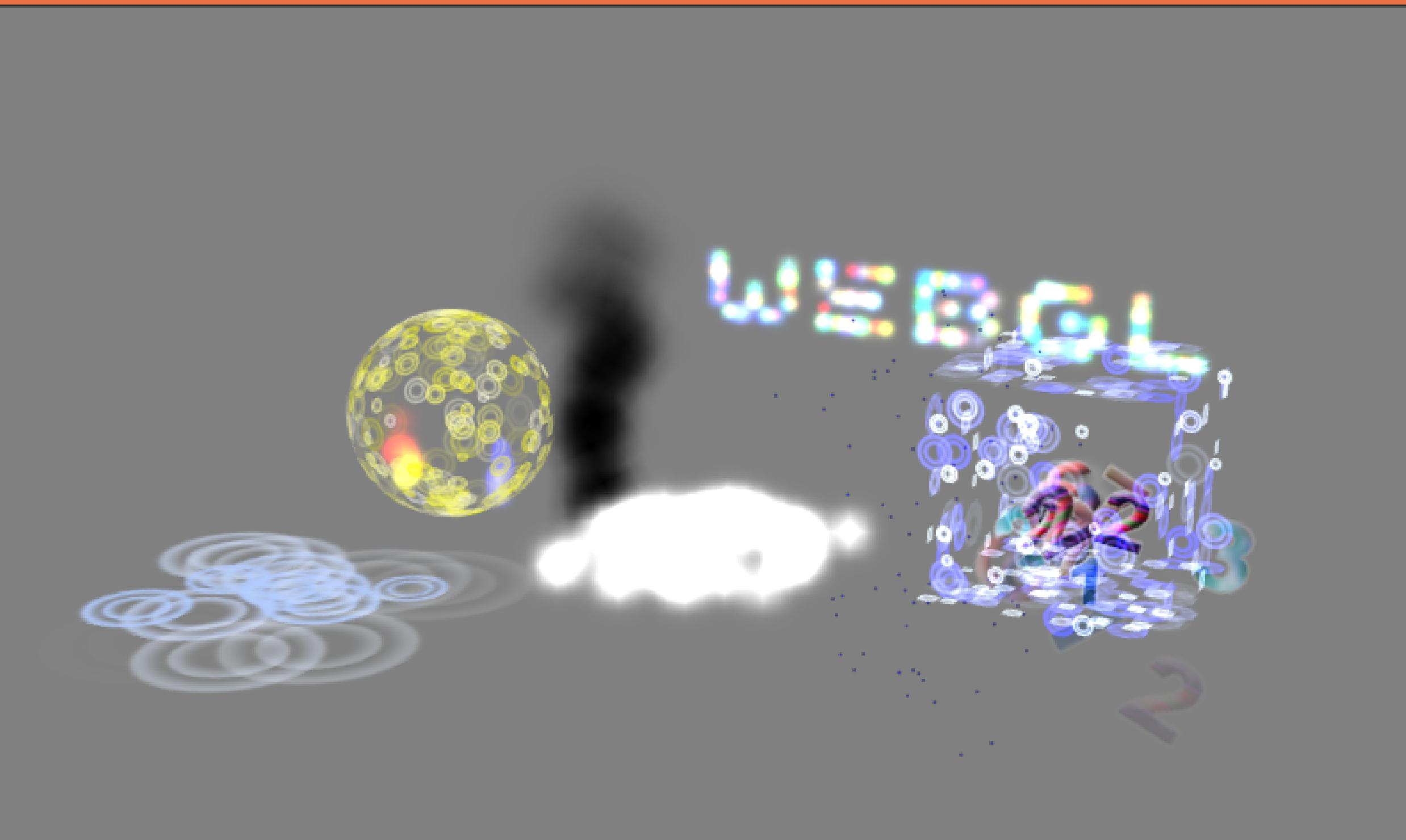
**Bottom Bar:** The bottom bar contains links to Source on Github and Author (@andrewray), and a message indicating the compilation took 1018.100ms.

# BMW i8

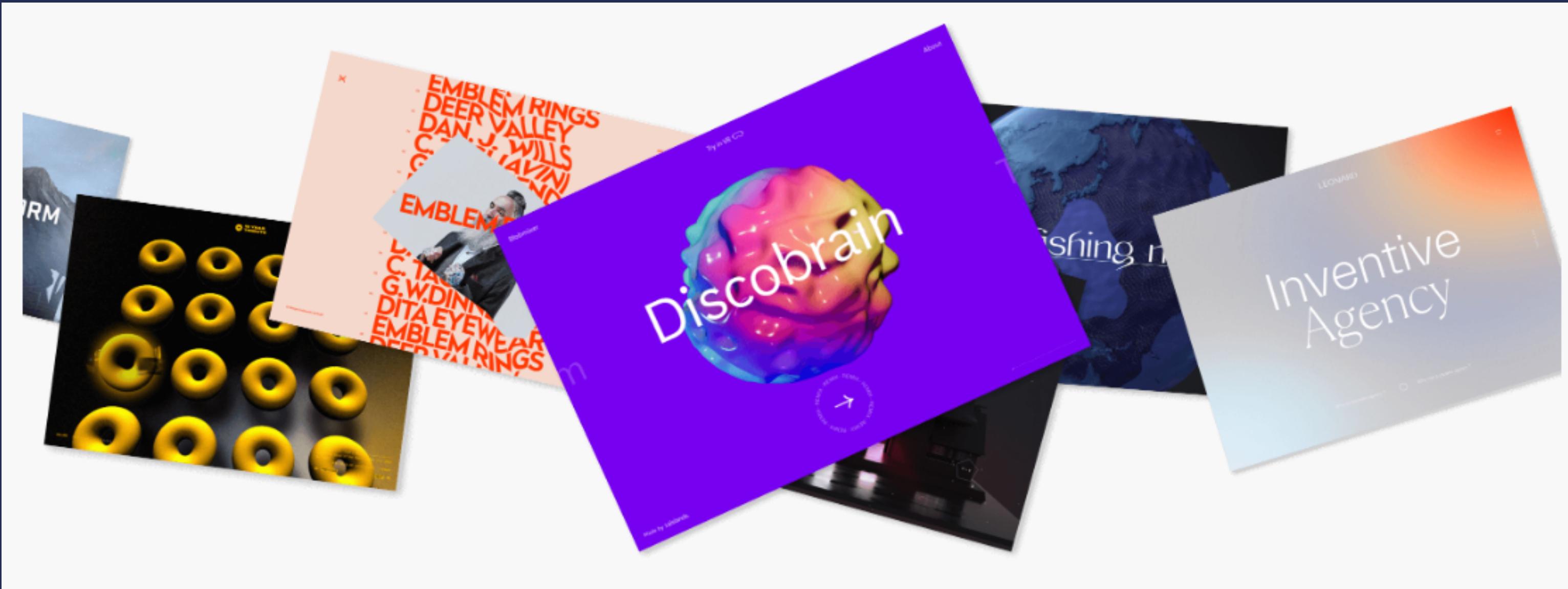


POWERED BY **PLAYCANVAS**

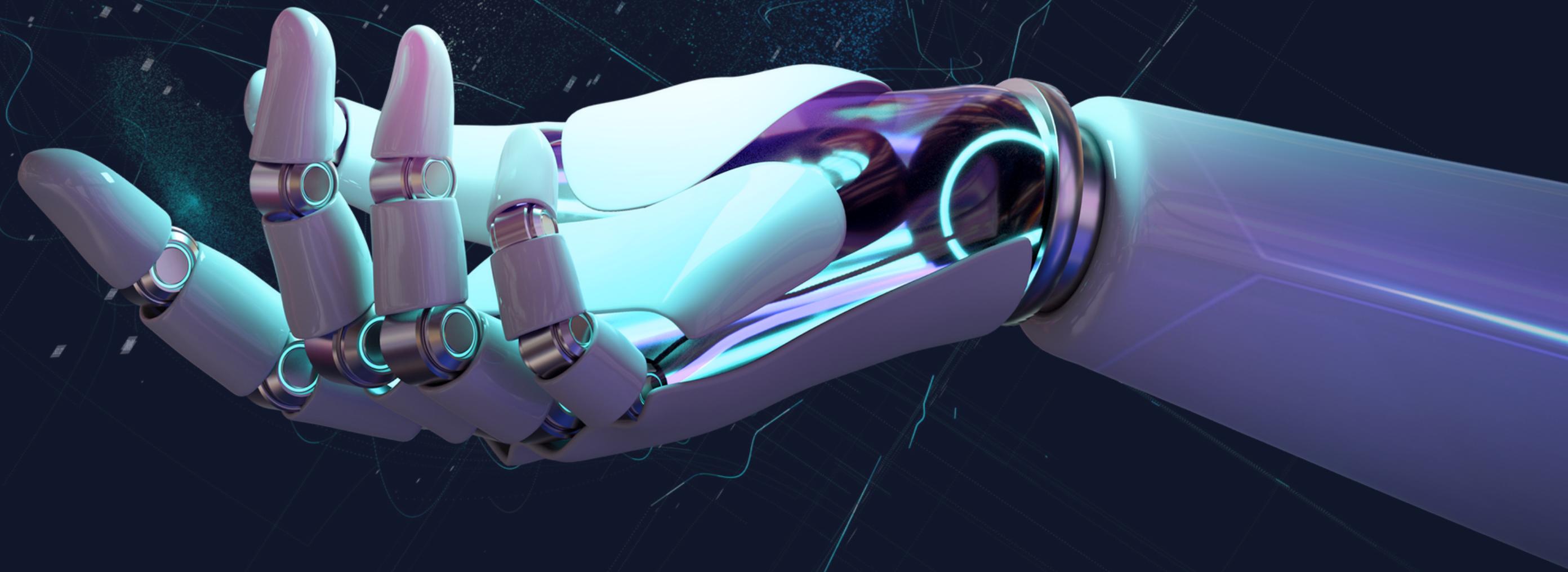
# Demo Particles

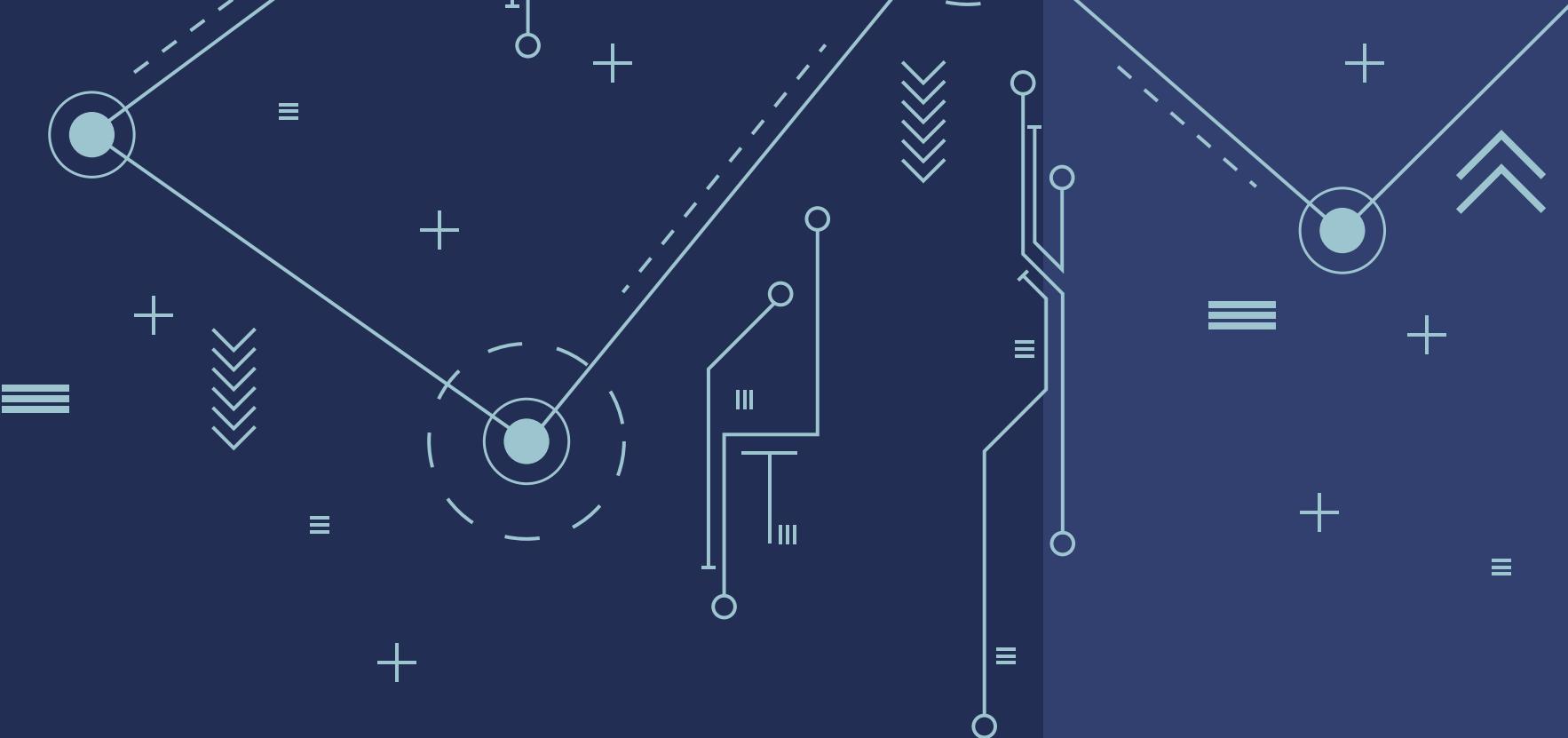


# Sites experimentais



# WebGLStudio





**Javi Agenjo**

*Criador da WebGLStudio*

**Pesquisador e desenvolvedor  
na Universitat Pompeu Fabra,  
Barcelona**

## Sobre a ferramenta



**Open-source**  
Código disponível no GitHub



**Plataforma totalmente Web**

Roda diretamente no navegador



**Colaboração**

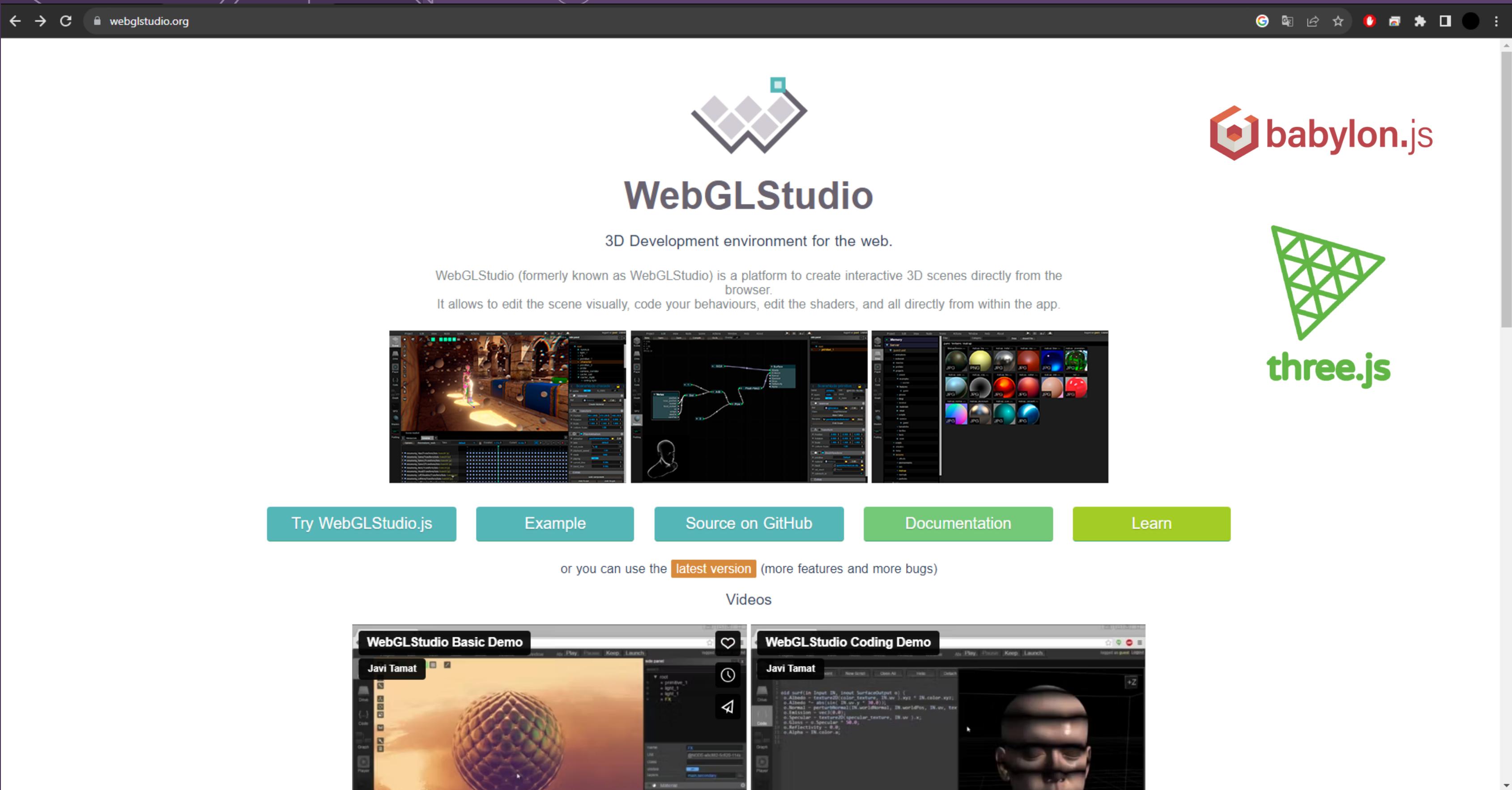
Permite que vários usuários trabalhem simultaneamente no projeto



**Documentação**

Grande quantidade de exemplos e documentação

# Site oficial



The screenshot shows the official website for WebGLStudio. At the top, there's a navigation bar with icons for back, forward, search, and other browser functions. The address bar shows "webglstudio.org". To the right of the address bar are standard browser extension icons.

The main content area features the WebGLStudio logo (a stylized 'W' made of squares) and the title "WebGLStudio" in large, bold letters. Below the title is the subtitle "3D Development environment for the web." followed by a brief description: "WebGLStudio (formerly known as WebGlStudio) is a platform to create interactive 3D scenes directly from the browser. It allows to edit the scene visually, code your behaviours, edit the shaders, and all directly from within the app."

Below the description are three screenshots of the software interface: one showing a 3D scene with spheres and a complex UI, another showing a node-based scripting editor, and a third showing a texture browser.

At the bottom, there are five buttons: "Try WebGLStudio.js" (teal), "Example" (teal), "Source on GitHub" (teal), "Documentation" (green), and "Learn" (green). A note below the buttons says "or you can use the [latest version](#) (more features and more bugs)".

Under the "Videos" heading, there are two side-by-side video player windows. The left window is titled "WebGLStudio Basic Demo" and shows a 3D sphere model. The right window is titled "WebGLStudio Coding Demo" and shows a 3D head model with a complex shader code visible in the editor.

# Recursos

## 1. Editor de Cenas 3D

Adicionar objetos, modelar geometrias, aplicar texturas e materiais, ajustar iluminação e definir animações.

## 2. Biblioteca de Ativos

Modelos 3D pré-fabricados, texturas e efeitos

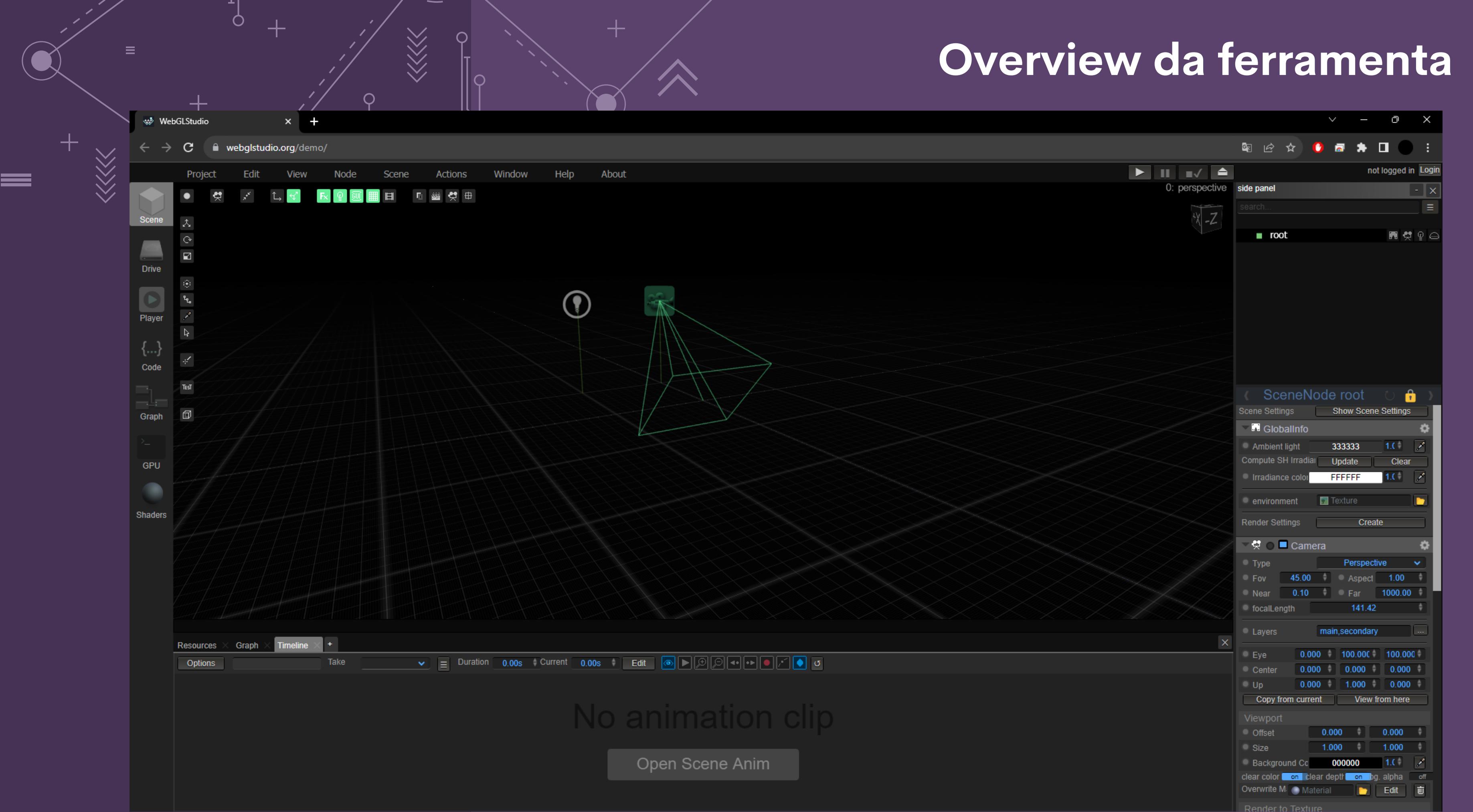
## 3. Scripting

Codificação em JavaScript

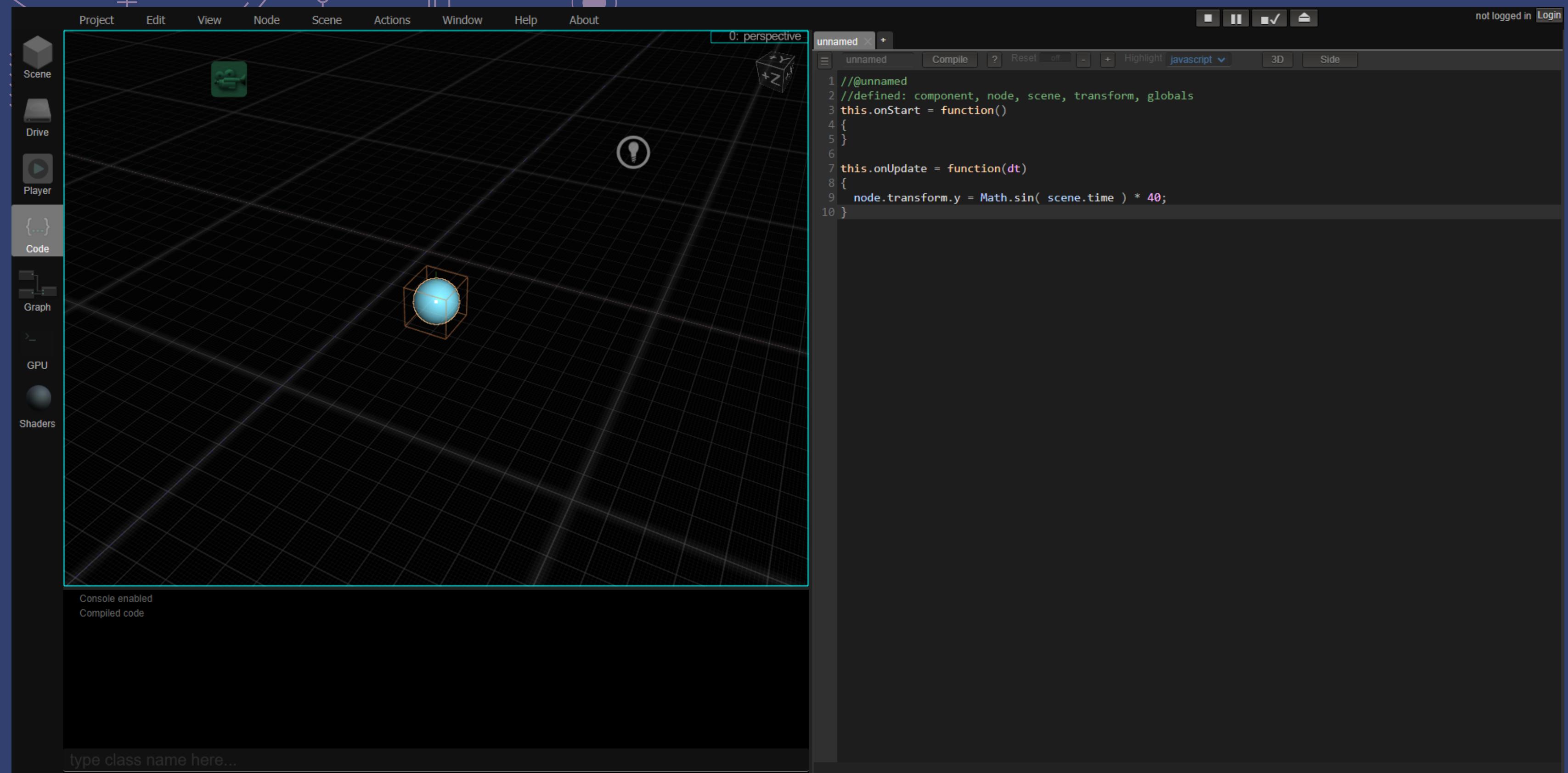
## 4. Visualização em Tempo Real

Visualizar as cenas 3D em tempo real dentro do próprio ambiente de edição

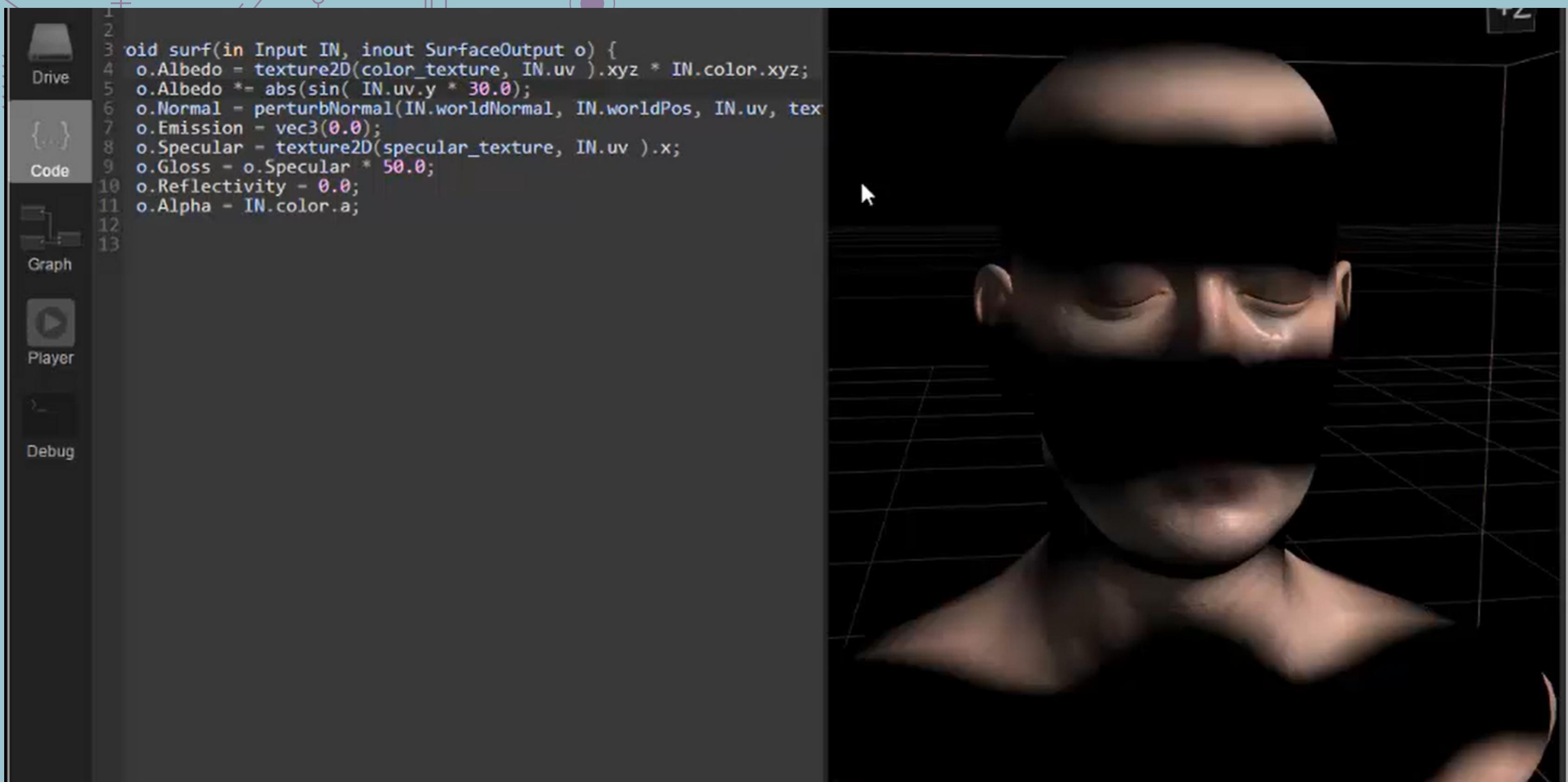
# Overview da ferramenta



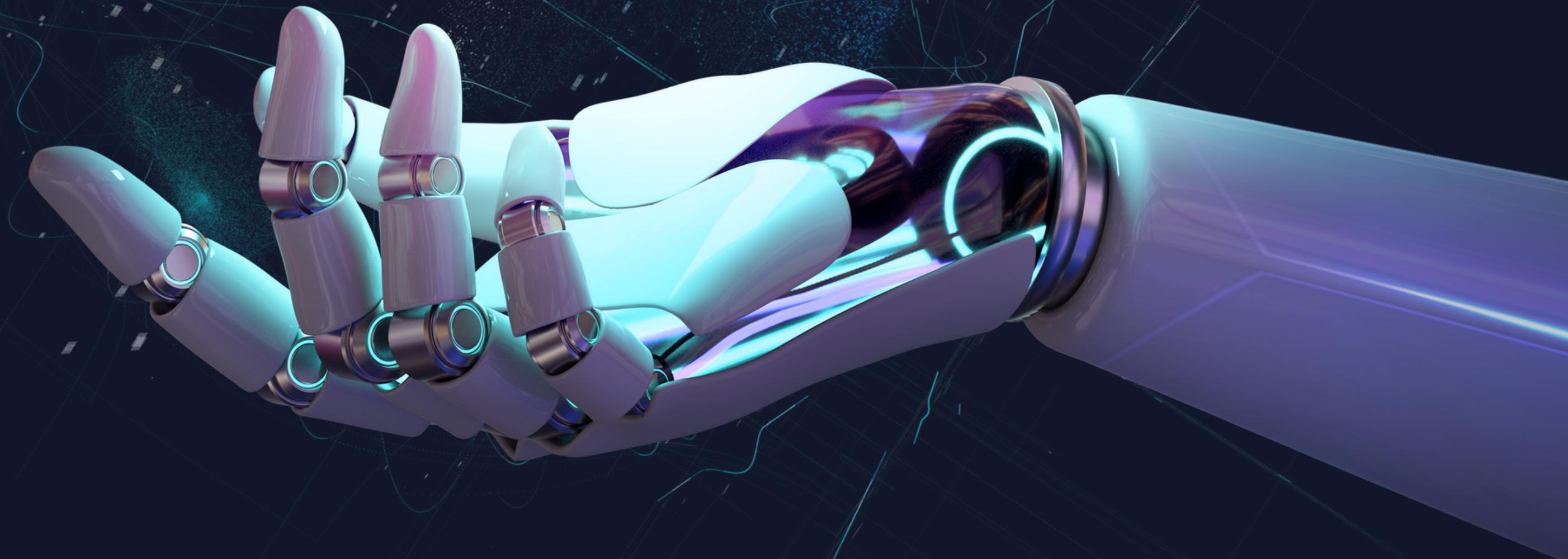
# Editor de código



# Sombras e Iluminação



# Impressora 3D

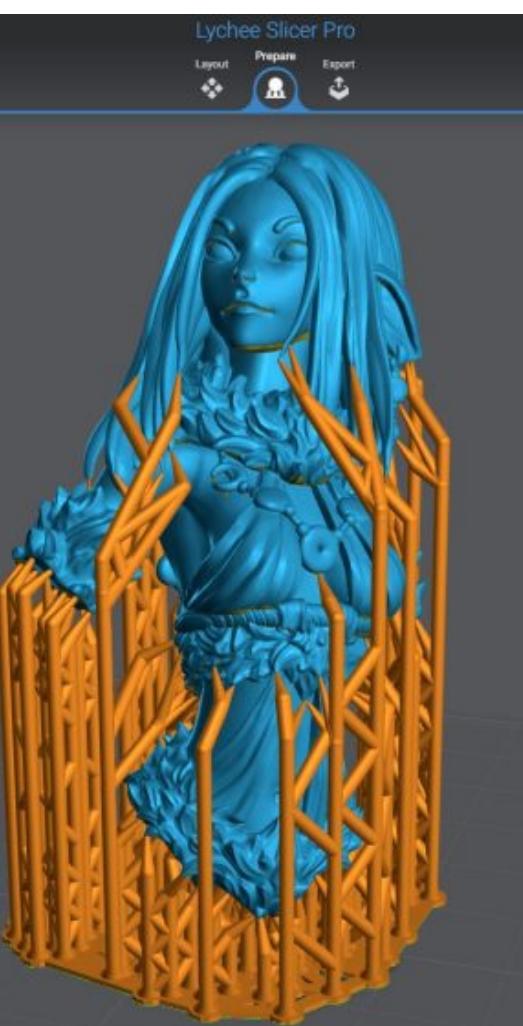
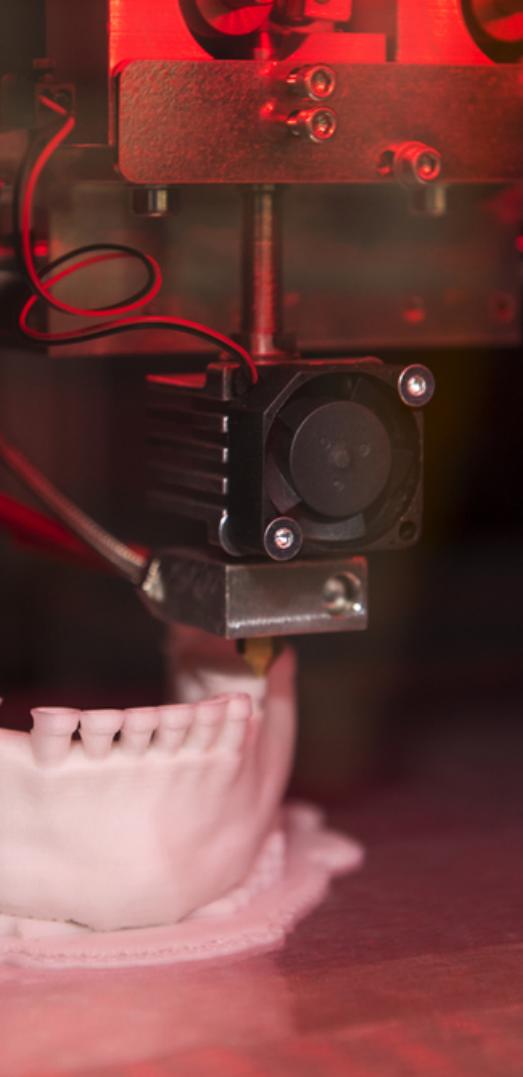
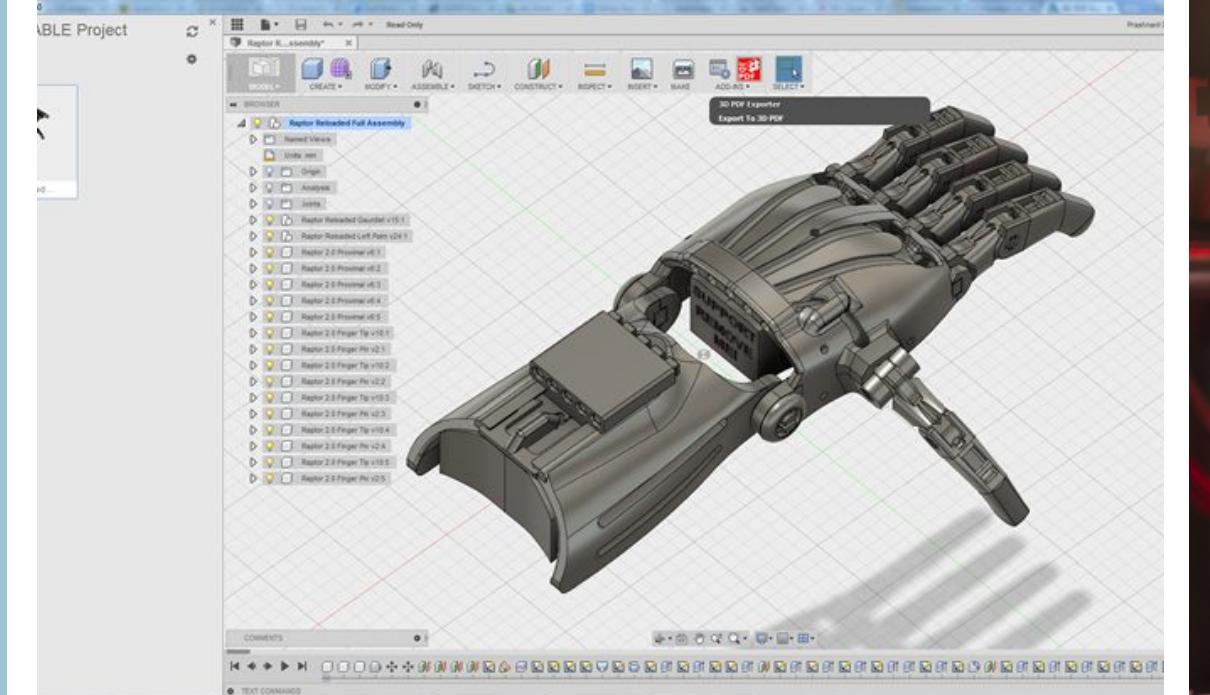
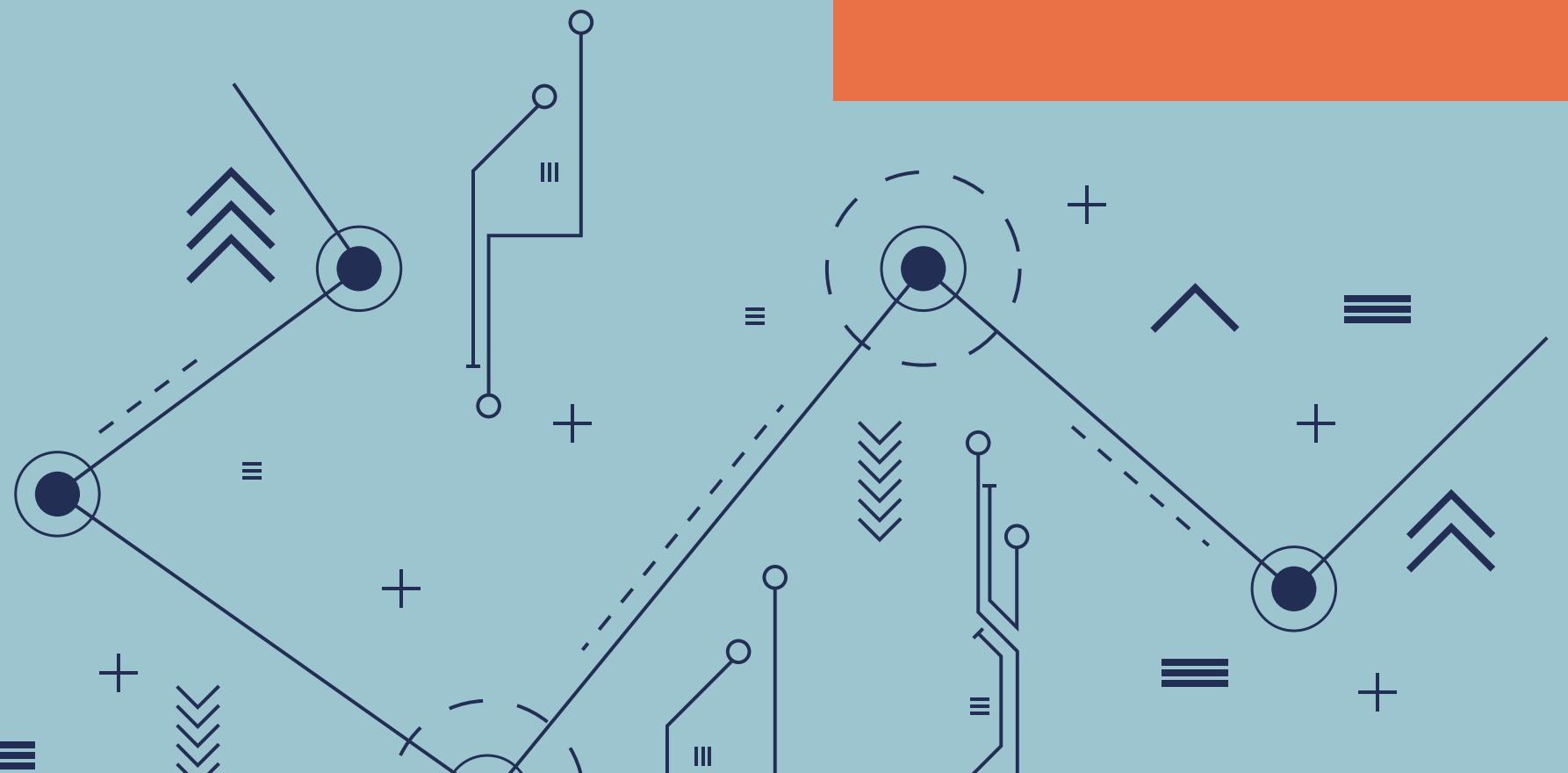


# Funcionamento

1. Modelagem  
Digital

2. Preparação do  
Modelo

3. Impressão



## 1. Fused Deposition Modeling (FDM)

Filamentos de material termoplástico

## 2. Stereolithography (SLA)

Laser ultravioleta para solidificar resina líquida

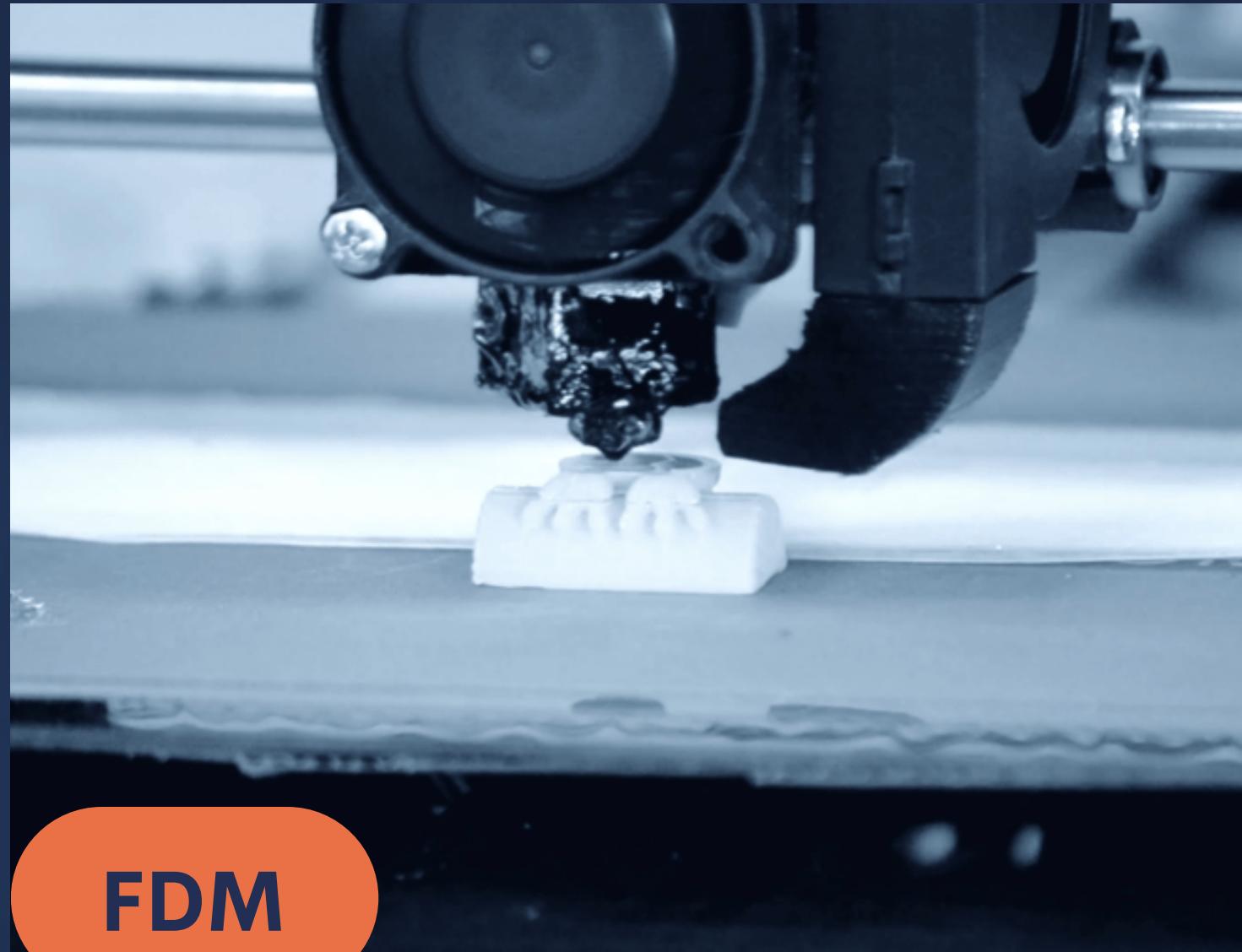
## 3. Selective Laser Sintering (SLS)

Laser de alta potência sinteriza pó de material (plástico, metal)

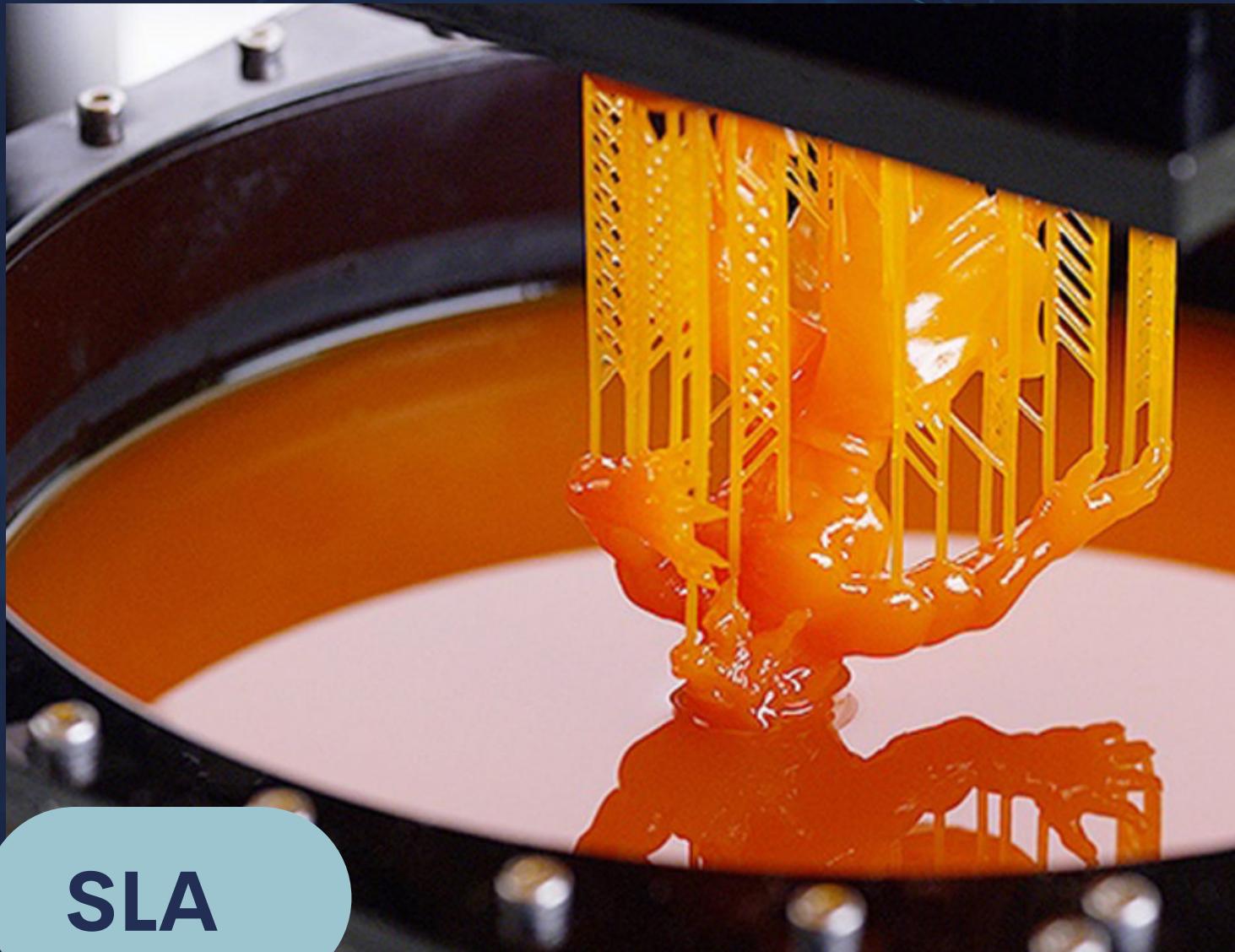
## 4. PolyJet

Gotículas de resina líquida que endurece sob luz ultravioleta

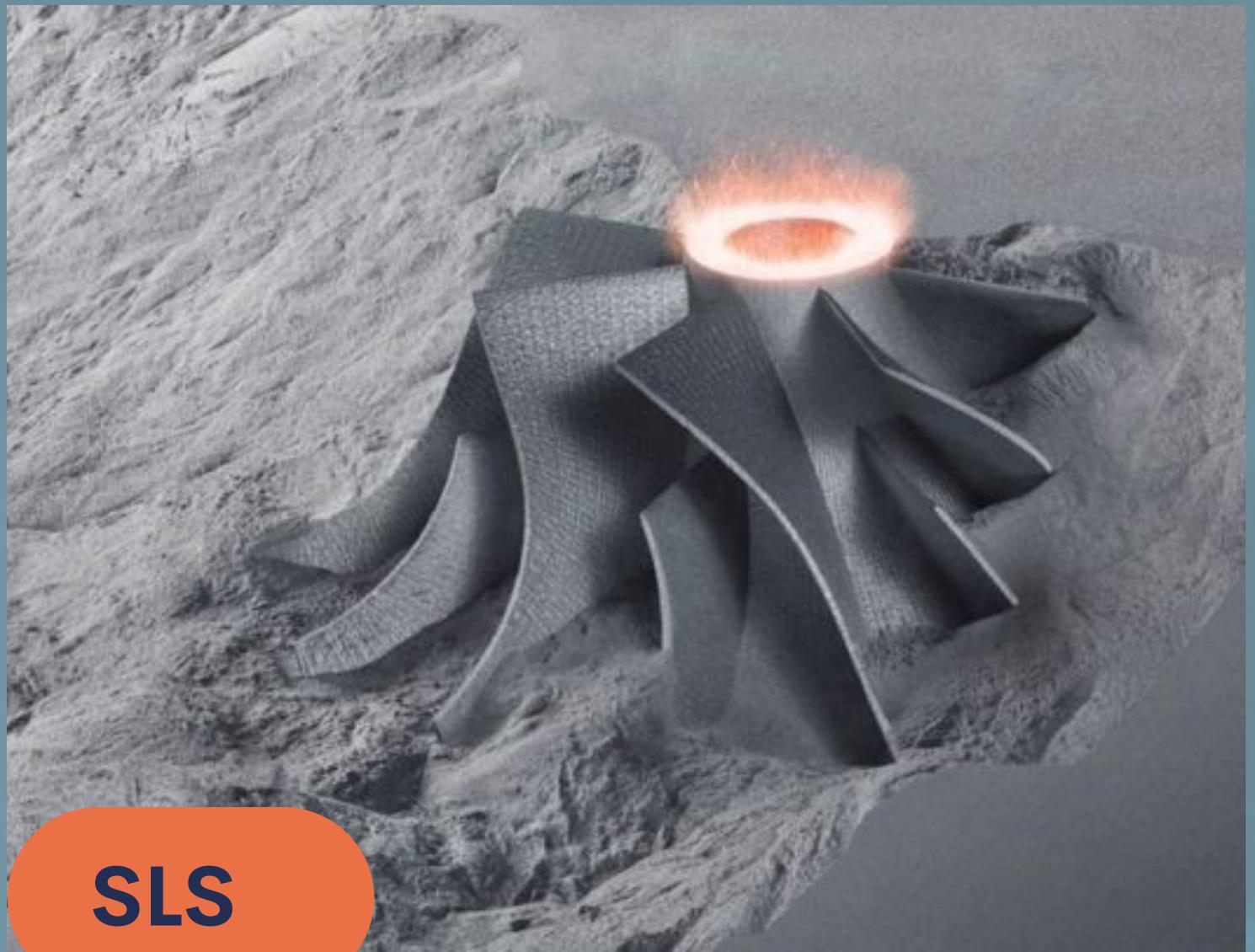
# Técnicas Utilizadas



FDM



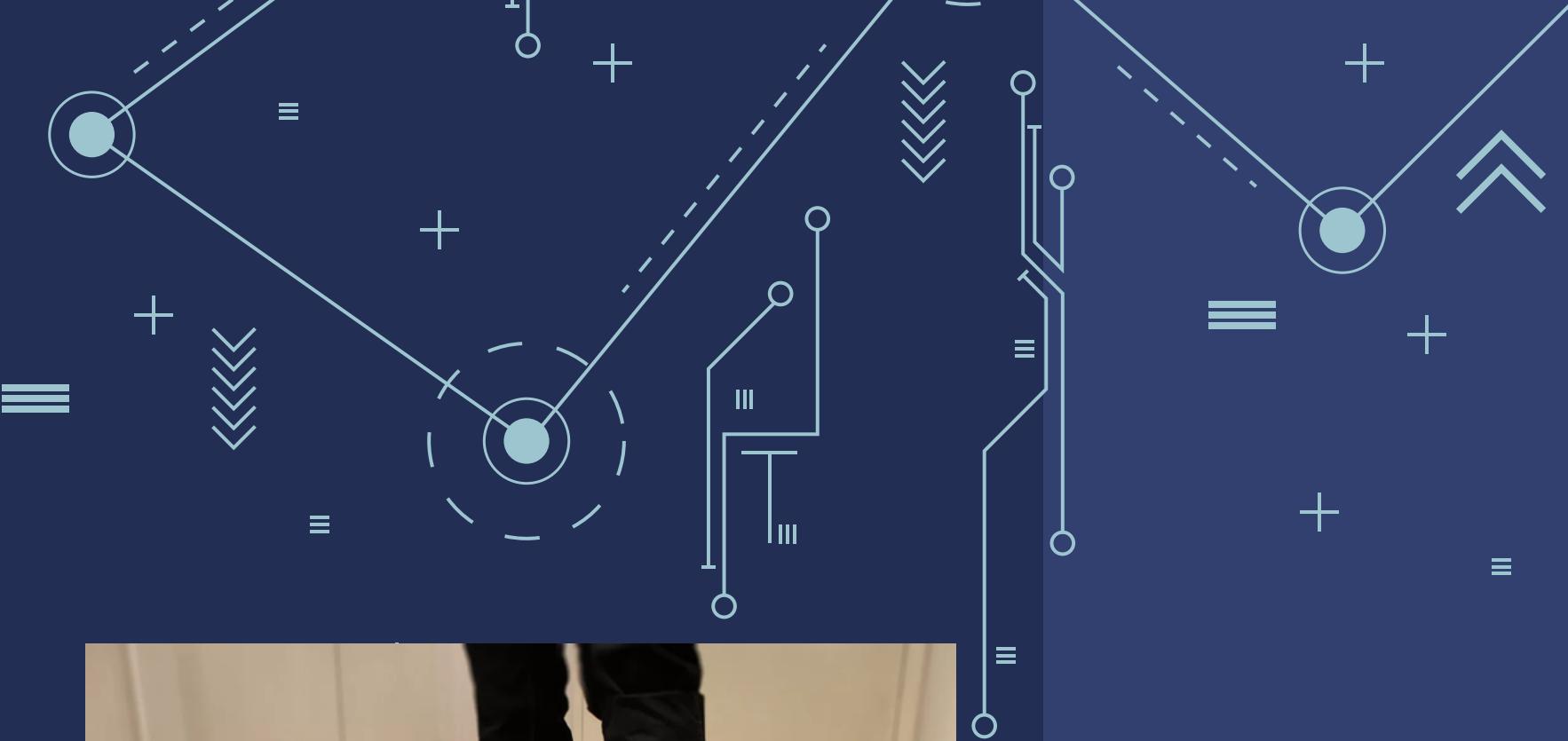
SLA



**SLS**



**PolyJet**



## Aplicações



### Indústria

Fabricação de peças



### Medicina

Proteses, modelos anatômicos, dispositivos médicos e tecidos (bioprinting)



### Arquitetura e Design

Maquetes arquitetônicas e itens decorativos



### Prototipagem Rápida

Protótipos físicos de produtos

# Cientistas criam tecido ocular em impressora 3D com células-tronco

Avanço permitirá melhor estudo de doenças do olho e desenvolvimento de novas possibilidades terapêuticas

Por O GLOBO

26/12/2022 14h00 · Atualizado



# Maior casa construída por impressão 3D nos EUA tem dois andares

Toneladas de concreto, cimento e areia? Nada disso, essa imensa casa de 372 metros quadrados é construída por impressão 3D

Por William Schendes, editado por André Lucena | 13/01/2023 09h40, atualizada em 13/01/2023 20h33



# Instituto de Medicina Regenerativa Wake Forest



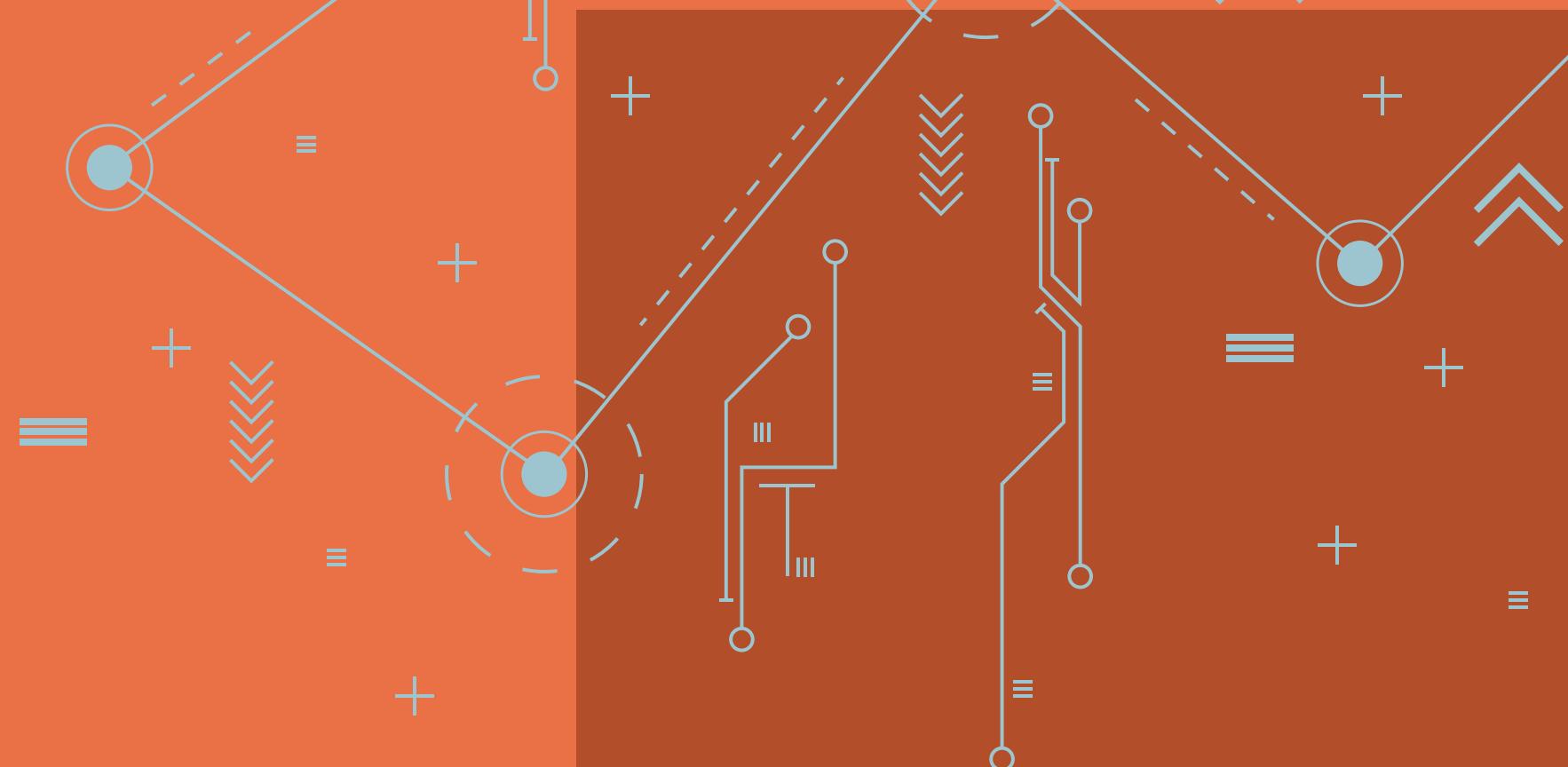
# Desafios e Avanços

**1.** Velocidade e Tamanho

**2.** Materiais Avançados

**3.** Custos

**4.** Qualidade e Precisão



Obrigado pela  
atenção

