TEACHING PHILOSOPHY STATEMENT & SYLLABI SUITE

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1. PEDAGOGICAL PHILOSOPHY: THE AGILE TECH-ARTIST

In digital production arts and visual effects, students often suffer from technical paralysis. The complexity of node-based networks, procedural data structures, Universal Scene Description (USD) layers, and real-time engines can overwhelm emerging artists. Furthermore, the rapid emergence of Generative AI, automated tracking, and real-time production paradigms has created widespread anxiety among students regarding their future relevance in the industry.

My teaching philosophy addresses these challenges through three core principles cultivated over 25+ years of production experience and academic instruction:

- **Low-Stakes Technical Resilience & Creative Problem Solving:** I remind students that CG technical artists are non-emergency problem solvers. Unlike medicine or firefighting, software errors carry no life-and-death stakes. Technical hurdles—whether a broken Houdini setup, an unoptimized shader in Unreal Engine, or a broken USD reference—are puzzles to be enjoyed, not sources of stress. I teach students to view technical challenges as fuel for creative growth. When an out-of-the-box solution does not exist, we use our foundational understanding of computer graphics to build custom workflows.
- **Long-Term Adaptability Over Tool-Specific Panic:** Throughout my career, I have navigated multiple 'game-changing' technical disruptions: GPU rendering revolutions, digital cinema transitions, remote production pipelines, real-time engines, and now Generative AI. Having adapted through each shift, I teach students how to bypass hype and focus on timeless fundamentals: solid artistic practice, rapid software adaptation, deep cultural interest, continuous experimentation, and long-term dedication. Tools change, but core storytelling, light, form, and problem-solving abilities remain relevant indefinitely.
- **Hands-On Mentorship in the Studio Environment:** Mastery in digital graphics cannot be achieved through passive observation; it requires dedicated hours of practice and pipeline execution. Drawing from my experience leading teams of up to 400 artists, I adopt a hands-on, daily presence in the studio/lab. I work side-by-side with students on project execution, guiding them through real-world troubleshooting, code debugging, and artistic refinement.

2. GRADUATE MENTORSHIP & THESIS ADVISING STRATEGY

Guiding MFA and MS graduate students requires balancing technical execution with deep human meaning. I reject the view that a graduate thesis is merely a formal requirement for graduation or a simple demonstration of software proficiency. If a scholar invests dedicated years into a research thesis, a conscientious mind must aim to leave a lasting footprint on history—provoking continued discussion, pushing technical boundaries, and questioning why we create what we create with computer graphics.

- **Human-Centered Purpose & Emotional Resonance:** Whether a thesis results in a film, a game, or modular technical tools, it must serve a higher human purpose. CGI is fundamentally a medium for human connection, shared emotion, and imagination—the very spark that drew us to masterpieces like Jurassic Park, E.T., or Star Wars. I guide students to ground their research in universal themes of resilience, empathy, and wonder, ensuring their work evokes genuine emotional impact for future generations.
- **Rigor in Critical & High-Stakes Visualizations:** Beyond entertainment, computer graphics plays a critical role in high-stakes visual domains—including medical imaging, aerospace engineering, forensic reconstruction, and scientific visualization. In these fields, visual accuracy and technical commitment are paramount. I push students to treat their thesis research as a rigorous primary act, elevating their technical discipline, research methodology, and precision to levels they previously thought unachievable.
- **Pre-Production Deconstruction & Pipeline Hygiene:** Graduate projects frequently fail due to scope creep or unorganized asset architecture rather than a lack of talent. Early in the thesis process, I help students deconstruct their vision into achievable production milestones. We establish rigid pipeline hygiene—including OpenUSD layer hierarchies, standardized folder structures, and relative paths—ensuring that technical friction never impedes artistic or scholarly expression.
- **Aligning Technical Innovation with Artistic Core:** Whether a student is exploring real-time ray tracing, procedural grooming, generative workflows, or custom pipeline scripts, I challenge them to justify the aesthetic and narrative necessity of their technical choices. I work alongside them in the lab to optimize assets (LOD management, texture memory profiling, shader complexity), ensuring their research executes at Tier-1 professional standards.
- **Executive Standards & Academic Rigor:** I mentor graduate candidates through every phase of scholarly documentation—writing defenses, detailing technical methodologies, and articulating research contributions. Concurrently, I evaluate their

breakdown reels, code repositories, and final portfolios through an executive lens, preparing them to lead in top-tier studios, research labs, and academic institutions.

3. PEDAGOGY IN THE ERA OF AI & AUTOMATION

- **Proactive Integration:** Banning emerging tools leaves students unprepared for modern industry pipelines. I teach students to utilize AI as an efficiency tool—for rapid concept exploration, automated tracking, asset pre-vis, and repetitive tasks—while maintaining total control over their creative vision.
- **Ethical and Moral Dialogue:** Because legal and policy frameworks for AI are still developing, I maintain ongoing ethical discussions in the classroom. We analyze intellectual property, dataset sources, digital ownership, and artistic integrity, encouraging students to evaluate the broader impact of their technical choices.
- **Collective Benefit:** I instill the principle that technology should serve collective and societal progress rather than purely selfish outcomes. We examine how automation can empower small teams to create ambitious, independent projects without sacrificing quality.

4. COMPLETE SYLLABI SUITE

DPA 8070 / 3070 — 3D Modeling and Animation

Instructor: Rodney Florencio Da Costa, MFA | Tools: Autodesk Maya, DaVinci Resolve, Arnold

Exposes students to current studio practice developing 3D computer graphics and animation for film, games, and visualization. Covers entry-level to intermediate pipelines across modeling, texturing, lighting, rendering, rigging, and character animation.

Key Learning Outcomes & Deliverables:

- Understand basic CG production steps and pipeline flow through props and environments.
- Create 3D poly/subdivision models with clean topology for deformation.
- Apply bitmap textures and generate physically-based (PBR) materials on geometries.
- Set up animation-ready character/prop rigs; execute walk cycles and fundamental character animations.
- Deliver professional-level lighting, rendering, and scene organization matching industry standards.

Topical Course Schedule:

- Weeks 1–3: CG production stages, asset flow, polygonal/subdivision modeling, clean topology for deformation.
- Weeks 4–7: UV unwrapping, surface detailing, PBR texturing, material assignment, and shader networks.
- Weeks 8–11: Basic skeleton building, binding/skinning, rigging principles, and control setups.
- Weeks 12–15: Character walk cycle animation, scene lighting, rendering passes, and portfolio turntable assembly.

DPA 8810 — Environment & Assets for Games & Virtual Production

Instructor: Rodney Florencio Da Costa, MFA | Expected Workload: Lecture + 2–3 hrs/day (17+ hrs/week)

Design and produce a portfolio-ready environment for Unreal Engine 5, demonstrating advanced asset creation, modular workflows, trim sheet texturing, PBR material logic, real-time lighting (Lumen), and professional scene assembly.

Key Learning Outcomes & Deliverables:

- Concept Design: Create an original environment drawing or concept sheet establishing scale and proportion.
- Modular Asset Creation: Build a production-quality prop set (20–30 assets with minimum 10 modeled/textured individually).
- Environment Assembly: Construct a full modular environment in Unreal Engine 5 (interior, exterior, or hybrid).
- Lighting & Composition: Apply professional-level scene lighting, atmospheric fog, and cinematic composition.
- Deliverables: Original concept art, prop set, UE5 assembled scene, and portfolio presentation (4K stills, turntables, 30-60s camera fly-through in Sequencer).

Topical Course Schedule:

- Weeks 1–3: Course introduction, pipeline overview, concept design, mood boards, grey-boxing layouts in UE5.
- Weeks 4–7: Modular kit modeling in Maya/ZBrush/Blender, game topology optimization, UV unwrapping, trim sheets, PBR texturing.

DPA 8000 — Visual Effects for Animation & Games (SideFX Houdini)

Instructor: Rodney Florencio Da Costa, MFA | Tools: Houdini (SOPs, DOPs, LOPs), VEX, Karma, Nuke

Hands-on experience with Houdini's procedural workflows to create industry-standard visual effects for film, TV, and games. Focuses on simulation systems, VEX control, technical artistry, and production-ready rendering.

Key Learning Outcomes & Deliverables:

- POPs Particle Systems: Forces, collisions, sprite/mesh instancing, and particle advection.
- MPM Solver (Material Point Method): Simulating continuum mechanics—mud, snow compaction, wet sand, and organic goo.
- RBD Dynamics: Material fracturing (Voronoi), constraint networks, secondary debris, and dust generation.
- FLIP Fluids & Pyro FX: Liquid splashes, volume sourcing, explosions, fireballs, and VEX attribute wrangles.
- Solaris, Karma & Compositing: USD stage integration, multi-pass AOVs, and final Nuke compositing.

Topical Course Schedule:

- Module 1–2: Interface, node-based procedural workflows, SOPs/DOPs, POP particle setups, and force fields.
- Module 3–4: MPM solver dynamics (sand/snow/goo), RBD fracturing, destruction setups, and debris systems.
- Module 5–6: FLIP fluid simulation, Pyro smoke/fire volumes, combustion controls, and custom VEX wrangles.
- Module 7–8: Karma/Mantra rendering, AOV extraction, deep compositing in Nuke, and portfolio breakdown reel.

DPA 6820 / 4820 — Sound for Animation & Games

Instructor: Rodney Florencio Da Costa, MFA | Tools: REAPER, Pro Tools, FMOD, Unreal Engine 5

In-depth, production-oriented exploration of sound design for animation, film, and interactive media. Develops professional workflows for recording, editing, mixing, and implementing sound for linear and real-time pipelines.

Key Learning Outcomes & Deliverables:

- Foley & Field Recording: Design and record high-quality sound effects using portable field recorders and foley stages.
- DAW Audio Editing: Layer, pitch-shift, and process sound using professional DAWs (REAPER, Pro Tools).
- Acoustics & Psychoacoustics: Apply frequency, phase, amplitude, and perceptual theory to visual media.
- Real-Time Integration: Implement sound in UE5 with attenuation, occlusion, sound queues, and event triggers.
- Mixing & Loudness Standards: Produce balanced stereo/spatial mixes meeting broadcast and game LUFS standards.

Topical Course Schedule:

- Weeks 1–3: Role of sound in storytelling, film vs. game audio pipelines, acoustics, and critical listening.
- Weeks 4–6: Microphone techniques, foley recording, noise management, and DAW editing fundamentals.
- Weeks 7–9: Syncing sound to picture, character/environment foley, creative processing, and sound synthesis.
- Weeks 10–12: Non-linear game sound principles, FMOD/UE5 asset organization, distance attenuation, and event triggers.
- Weeks 13–15: Mixing, dynamic range control, LUFS mastering, and portfolio breakdown presentation.

DPA 6820 / 4820 — Advanced Character Rigging

Instructor: Rodney Florencio Da Costa, MFA | Tools: Autodesk Maya, Python, MEL

Firsthand experience with contemporary studio practices in 3D character rigging. Covers intermediate and advanced rigging mechanics for production-ready props and bipedal/quadrupedal cartoon characters.

Key Learning Outcomes & Deliverables:

- Joint Placement & Hierarchy: Strategic joint layout based on anatomical pivot points.
- Control Systems: IK/FK switch systems with seamless blending, pole vector controls, and squash & stretch spines.
- Complex Leg & Foot Rigs: Reverse foot setups, custom roll, pivot banking, and finger curl channel attributes.
- Facial Rigging & Deformations: Head auto-orientation, blendshape networks, joint-based facial controls, and skin weight painting.

DPA 8000 — Character Effects for Films (CFX)

Instructor: Rodney Florencio Da Costa, MFA | Tools: Maya nCloth/Nucleus, Houdini Vellum, XGen, Karma

Creates production-ready character effects including dynamic cloth, hair/fur grooms, and secondary simulations in Maya and Houdini, emphasizing believable movement integrated into film/VFX pipelines.

Key Learning Outcomes & Deliverables:

- Cloth Simulation: nCloth and Vellum setups, garment patterns, collision layers, constraints, and caching.
- Grooming & Fur: Procedural grooming using XGen and Houdini Solaris for realistic hair, fur, and feathers.
- Secondary Dynamics: Soft-body flesh jiggle, skin sliding, capes, belts, jewelry, and rigid accessory interactions.
- Shot Cleanup & Caching: Alembic/USD cache hand-offs, topology wrapping, and render-ready scene preparation.

Topical Course Schedule:

- Module 1–3: CFX overview, Maya Nucleus system, nCloth garment patterns, collision matrices, and constraint setups.
- Module 4–6: Houdini Vellum cloth, groom guide curves, XGen hair setups, density/clumping modifiers, and shading.
- Module 7–9: Soft-body flesh dynamics, secondary accessory simulation, and interaction logic.
- Module 10–11: Karma/Arnold heavy-scene rendering, shot cleanup, cache baking, and demo reel turntables.

DPA 8150 — Visual Effects Compositing

Instructor: Rodney Florencio Da Costa, MFA | Tools: Foundry NukeX, DaVinci Resolve, Mocha

Explores visual effects compositing in Nuke, focusing on integrating 3D CG renders, matte paintings, and live-action footage using industry-standard node-based workflows.

Key Learning Outcomes & Deliverables:

- Keying & Rotoscoping: Green/blue screen extraction (Keylight/Ultimatte), edge refinement, despill, and animated rotoscoping.
- Tracking & Matchmoving: 2D tracking, planar tracking in Mocha, and 3D camera tracking for set extensions.
- Multi-Pass CG Compositing: AOV rebuilding (Diffuse, Specular, AO, Depth), linear color spaces, and ACES color matching.
- 2.5D Environment Setups: Nuke 3D projection cards, particle atmospheric FX (smoke, fire, fog), and camera projection.

Topical Course Schedule:

- Weeks 1–4: Node-based interface, footage ingest, linear workflow, rotoscoping, RotoPaint, and green screen keying.
- Weeks 5–8: 2D/3D camera tracking, Mocha planar tracking, multi-pass CG render recombination, and color grading.
- Weeks 9–12: 2.5D set extensions, projection cards, atmospheric particle effects, lens distortion, and depth of field.
- Weeks 13–15: Final shot delivery, ACES color management, breakdown reel formatting, and portfolio assembly.

DPA 6000 / 4000 — Visual Programming for Games (Unreal Engine Blueprints)

Instructor: Rodney Florencio Da Costa, MFA | Tools: Unreal Engine 5.x (Blueprints, Sequencer)

Introduces game prototyping and visual programming using Unreal Engine 5 Blueprint technology, simulating rapid industry game development practices.

Key Learning Outcomes & Deliverables:

- Blueprint Fundamentals: Event graphs, functions, macros, variable types, and node execution logic.
- Player Mechanics & Mechanics: Character controllers, pawns, enhanced input mapping, and camera systems.
- Game Logic & UI: Triggers, overlaps, raycasting, health/inventory systems, and UMG user interface menus.
- AI & Behavior Trees: NavMesh navigation, Blackboard variables, AI perception, and state machines.

Topical Course Schedule:

- Weeks 1–4: UE5 interface, Blueprint nodes, variables, functions, player actors, pawns, and input mapping.
- Weeks 5–8: Object communication, event dispatchers, line traces, health/damage logic, and UMG interface widgets.

DPA 6440 / 4440 — Advanced 3D Modeling & Sculpting

Instructor: Rodney Florencio Da Costa, MFA | Tools: ZBrush, Blender, Maya, Substance

Exposes students to current studio practices developing 3D computer graphics regarding 3D modeling and sculpting. Emphasizes character concept development and production-ready modeling workflows, from high-poly sculpting to clean quad topology.

Key Learning Outcomes & Deliverables:

- High-Poly Sculpting: Master primary forms, secondary shapes, and fine skin/fabric tertiary detailing in ZBrush/Blender.
- Clean Retopology: Re-topologize sculpts into animation-ready meshes with optimized quad edge flow and articulation loops.
- Subtool & Layer Management: Manage complex multi-mesh assets, Dynamesh, SubD levels, and morph targets.
- Portfolio Asset Delivery: Produce hero asset turntables, wireframe overlays, UDIM UV maps, and texture maps.

Topical Course Schedule:

- Weeks 1–4: Concept sheet analysis, blocking primary proportions, ZBrush/Blender digital clay sculpting.
- Weeks 5–8: Mid/tertiary detailing, subtool organization, cloth/accessory sculpting, and anatomical validation.
- Weeks 9–12: Retopology for deformation, edge flow for joints/facial areas, UDIM unwrapping, and map baking.
- Weeks 13–15: PBR texturing, beauty lighting, clay/wireframe renders, and final portfolio turntable package.