

Cinema 4D Release 20 Complete Feature List

- **General**
 - Faster Picture Viewer playback
 - Speed and memory optimizations
 - Installer Command Line Interface (CLI) mode
- **Exchange**
 - SketchUp
 - Update to SketchUp 2018 SDK
 - Null objects with only one child polygon object now create one combined object instead
 - Alembic
 - Update to Alembic 1.7.7 SDK
 - Performance improvements by caching matrices
 - Users can now bake selected objects to Alembic
 - New animation retiming controls
 - Set Frame (for manual animation control via keyframes)
 - Offset Animation
 - Playback modes (Play, Loop, Ping Pong)
 - Speed setting
 - Time Remap Curve Interface
 - FBX
 - Update to FBX 2018.1.1
 - Support for instances
 - Axis preferences:
 - Flip Z Axis
 - Up Axis (Default, X, Y, Z)
 - New CAD imports (CATIA V5, JT, Solidworks, STEP, IGES)
 - Houdini upgrade to 16.5.536
 - AI importer: Illustrator splines now load in at the correct scale
- **Modeling**
 - Enhanced modeling kernel
 - Several commands migrated to the new modeling kernel provide much better preservation of surface attributes (UV, etc.)
 - Delete Components command with much faster performance and better behavior (e.g., deleting disconnected points)
 - Triangulate command
 - Triangulate N-gons
 - Re-Triangulate N-gons
 - Remove N-gons
 - Align Normals
 - Reverse Normals
 - Several tools migrated to the new modeling kernel
 - Extrude Polygon
 - Extrude Inner
 - Matrix Extrude
 - Primitives now use the new modeling kernel
 - Sphere (Icosahedron, Octahedron mode), Platonic and Pyramid primitives now generate non-overlapping UV coordinates
 - An option is available to convert legacy primitives from old scenes to use the new behavior
 - The Structure Manager now automatically switches the Component mode (Points, Polygons, ...) to the mode selected in the Structure Manager
 - Custom Data tag
 - A new API allows 3rd-party developers to create custom Data tags, which store surface attributes and can also provide interpolations functions.

- Indirect Illumination
 - Emission
 - Environment
 - World Coordinate
 - Texture Coordinate
 - Geometry Normal
 - Shading Normal
 - Depth
 - Object ID
 - Object Group ID
 - Material ID
 - Anti-Aliasing can be enabled for
 - World Coordinate
 - Texture Coordinate
 - Geometry Normal
 - Shading Normal
 - Depth
 - Object ID
 - Material ID
 - Object Group ID
 - Shadow Catcher
 - 2D Noises: users now can use all 2D noises except 'sparse convolution' in the legacy base shader.
 - New Seed setting: users can now specify a seed that is used for rendering.
 - Ray Depth can now be restricted (Diffuse, Glossy Reflection, Refraction, Glossy Refraction)
 - Shadow Ray Depth can now be set
 - Support for Metal 2
 - Compiling kernels on demand, shaders that introduce a big chunk of GPU kernel code will not be included in the initial kernel compilation. The kernel compilation is triggered when such a shader is added.
 - Scenes are now cached when animations are rendered to the Picture Viewer.
 - New Reload Scene per Frame option to enforce R19 behavior
 - General performance enhancements
- Physical Renderer
 - Improved progressive rendering performance
- **Materials**
 - General
 - Immediate low-resolution baking for Viewport
 - Improved shader / material baking for the Viewport
 - Updated Material previews
 - Updated scene setup
 - Several new scenes
 - MoGraph Beat Shader now accepts float values for BPM
 - New node-based materials
 - Over 140 nodes available
 - Projection nodes can be visualized in the Viewport
 - Node networks can be turned into material assets
 - Node based Materials can be edited in the Node Editor, Material Editor and Attributes Manager
 - New Node Editor based on new UI framework
 - Attributes Area, displaying the parameters of the selected nodes
 - A specialized version of the Attribute Manager
 - New connector element showing dependencies within the shading/rendering context
 - The Connector context menu allows to:
 - Connect Nodes

- Textures
 - Load Textures
 - Replace Nodes
 - Insert Converters
 - Copy
 - Paste (Link)
 - Paste (Duplicate)
 - Remove
 - Mute Ports
 - Propagate Ports
- Basic tab
 - Name
 - Asset Version dropdown shows the different versions of a node (if available)
 - Custom Node color
- Inputs tab
 - The input attributes of the selected node
 - Nodes can have a dynamic number of inputs (e.g., the gradient can have a variable number of Knots)
 - The command Show Sub-channels can switch the layout to also show sub-channels of a parameter (e.g., Color.R, Color.G, Color.B, Color.A for "Color")
- Context tab
 - Enables users to replace the context of many Nodes, e.g., to change the UV mapping for this node.
- Asset area
 - Lists all available assets provided by MAXON or stored by the user
 - The asset list can be filtered by name and keywords
 - A keyword filter can set certain parameters in a node (e.g., a search for "Buya" will show a Basic Noise Node with Buya set as the Noise type)
 - Context menu
 - Create New category
 - Create Node
 - Import Assets
 - Create New Database
 - Mount Database (Folder / Zip File)
 - Unmount Database
 - Export Database
- Nodes area lists all the Nodes in the current setup
 - The Nodes list can be filtered
 - Nodes can be cut, copied, pasted, deleted and duplicated
- Info area, displaying information about the selected Node / asset / Wire (name, version, warnings, ...)
- Nodes commander, allows the user to search for assets by name and keyword
- Node view
 - Nodes
 - Header (displays the title, preview and node state toggle)
 - Can be colored to give users a way to organized their Node networks
 - Naming of the Node can be changed
 - Body (includes in- / out-port groups, port bars, port slots and port names)
 - The body can display all ports, no ports or only the connected ports
 - Nodes can have two major states (full and collapsed)
 - Nodes can be displayed in vertical or horizontal layout
 - Ports

- Node ports can have different states (unconnected, connected, propagated, converted, group ports, error)
 - Node ports are color coded to make it easy to differentiate between different types of ports.
 - Ports can be renamed
 - Wires
 - Several ways to connect a Wire to a port:
 - Connect a Wire straight to a port
 - Release a Wire on the port name
 - Release a Wire on the group port name. A pop-up will appear with compatible ports of the group the Wire can connect to
 - Release a Wire inside the empty area of the Node. Again a pop-up with all compatible ports will appear
 - Wires can be displayed as Linear or Bezier curves
 - Wires can be muted (displayed as a dotted line)
 - Special Nodes
 - Start Node: the Node's attributes will be displayed in the Material Editor and the Attribute Manager when the Node material is selected
 - Solo Node: allows the system to use the data from this Node to be displayed in the Viewport and previews
 - Group Node: a Node that contains a nodal network
 - Asset Node: Group Nodes can be converted into Assets
 - Users can use different techniques to navigate the Node View, including touch gestures.
 - Navigator mini map shows an overview of the complete Node network, can be used to quickly navigate the Node network
 - Group bars on the left and right sides of the Node View can be used to propagate the ports to the outside of the group.
 - Nodes can snap to the grid when moved
 - Toolbar shows:
 - Breadcrumb display of the path to the currently edited Node
 - Filter Field
- Uber Material
 - Material Asset, build with the new Node system
 - Three reflection channels
 - Diffuse Channel: renders diffuse reflections
 - Reflection Channel with three reflection modes
 - Artistic – blends between two user defined colors
 - Dielectric – for dielectric reflections, such as plastic
 - Conductor – for conductors, e.g., metals
 - Coating channel, a simplified dielectric reflection layer to render effects such as a clear coat
 - Emission layer for emissive effects such as luminous materials
 - Transparency for refractive materials such as glass
 - Opacity to control the material's opacity
 - Bump to control global bump mapping
 - Normal to control global bump mapping
 - Displacement to control the displacement of the material
- New Node materials
 - Car Paint
 - Ceramic
 - Concrete
 - Cutout
 - Emission

- Gold
 - Granite
 - Marble
 - Metal
 - Plastic
 - Rock
 - Wood
 - Material Manager
 - New commands in the Create menu
 - New Uber Material
 - New Node Material
 - Node materials (displays all materials in the asset repository folder)
 - Can now open the Node Editor
- **Workflow/UI**
 - Compositing tag now has a ProRender tab
 - - Shadow Catcher Alpha
 - Light Portal
 - Object Group ID
 - Multi Instances
 - New Instances integrated in the Cloner object, Instance object and supported by all internal Render Engines
 - Multi Instances are stored as one object internal, resulting in higher performance and less allocated memory
 - Supports different render modes in the Viewport (Off, Points, Matrix, Bounding Box, Object)
 - Supports the Color shader and MoGraph colors
 - Project Settings
 - Use Color Channel for Node Material"" setting
 - New Console
 - Categories provide more overview
 - Python console can now completely replace functionality of the Command Line
 - Output can be written to files
 - Drastically improved performance
 - New gradient
 - Updated interface
 - Gradient color bar can be displayed in 3 different sizes (small, medium, large)
 - Selected knots now have an orange outline
 - If more than one Knot is selected, selection handles appear. They allow to move all selected Knots at the same time to to scale the range
 - New Double Selected Knots and Distribute Selected Knots command in the Context menu
 - New Interpolation mode Blend
 - Interpolation can now be set per Knot
 - Intensity renamed to Brightness (only available in the Legacy gradient)
 - New options if gradient is used in User Data"" (COLOR, ALPHA, NOEDITCOLOR, NOPRESET, NOINTERPOLATION, NOKNOTPOSITION, NOBIASPOSITION, NOBRIGHTNESS)
 - New Gradient Node
 - Can display textures and shaders in the gradient color bar
 - Can display alpha
 - Color Chooser is extended with an Alpha slider
 - Blending Space can be set to Linear or sRGB
 - Knot symbol changes: if this Knot is driven by a Node input
 - Enhanced Color Chooser
 - Color Chooser now can store alpha values in swatches
 - Color Picker now is always available when the Color Chooser is collapsed

- Color Chip context menu now offers option to enable/disable Alpha (where applicable) and to copy & paste a color
 - The Color Chooser in the unfolded state is now responsive to the size of the manager it displays
 - In the Color Wheel mode it is possible to click on the number on the right side to define the amount of color samples directly
 - The Hex mode now can be enabled directly in the Color Chooser Interface
 - Linear Numeric Values switch allows to display the color sliders linearly in the nodes interface
 - Alpha slider in the nodes interface
- Texture Manager
 - Channel column is renamed to Material Path, also supports node-based materials and displays the path within the material
 - Edit menu now contains commands formerly only available in the context menu (Show File in Explorer/Finder, ...)
 - New Open File in Manager behavior – a new command and Show in Attribute Manager now displays the attributes of the bitmap shader / Image Node.
 - Open Material in Manager is now exposed as a command.
 - Preview shows resolution and bit depth now and small images are centered
- Attribute Manager was adapted to the Nodes' workflow
 - New Connector interface to handle node connections
- Preferences
 - Interface: new dropdown menu Field Remapping Graph (Hide, Show, Hide in Field lists)
 - Input devices: new setting to enable touch devices
 - Files / Path: new Fields lists for file assets and database search paths
 - Plug-ins: new Field list for plug-in search paths
 - Units / default sets: new Alpha mode and Hexadecimal mode check boxes
 - New group Gradient
 - Size drop-down menu (Small, Medium, Large)
 - Selection handles check box
 - New group Alpha
 - Grid Color drop-down menu (Light, Medium, Dark)
 - Renderer / ProRender: new group Out of Core Cache
 - Custom Location check box
 - Location path
 - Material (previously Material Preview)
 - New group Node-based Materials
 - Node Preview Size drop-down menu (Small, Medium, Large, Huge)
 - 3D Preview Scene drop-down menu
 - Node Previews check box
 - Preview HUD check box
 - Modeling/Sculpting (previously Sculpting):
 - New group Modeling
 - Disconnected Points on Delete drop-down menu (Remove (press Shift to preserve), Preserve (press Shift to remove))
 - Import/Export:
 - Settings for new CAD formats:
 - CATIA (*.CATPart, *.CATProduct, *.cgr) Import settings
 - IGES (*.iges, *.iges) Import
 - JT (*.jt) Import
 - Solidworks (*.SLDPrt, *.SLDAsm, *.SLDDrw) Import
 - STEP (*.stp, *.step, *.p21) Import
 - Settings include:
 - Settings to enable/disable the import of geometry, splines, instances, helper and hidden objects

- Settings how to import Normals, display colors, layers and materials
 - Combine by None, Original Bodies, By Topology, By Color or By Layer
 - Heal and Stitch
 - Optimize Hierarchy
 - Setting to import Source Mesh
 - Settings to import LOD with JT
 - Settings to influence the tessellation, also scale-based tessellation
 - FBX (*.fbx) Export
 - General: new Instances check box
 - Additional: new Flip Z Axis check box and new Up Axis drop-down menu (Y Axis (default), X Axis, Z Axis)
 - FBX (*.fbx) Import
 - General: new Instances check box
 - Additional: new Flip Z Axis check box and new Up Axis drop-down menu (Y Axis (default), X Axis, Z Axis)
 - Volume (*.vdb) Export
 - Scale input field
 - Animation check box
 - Name drop-down menu
 - From and To input fields
 - Selected Only check box
 - Volume (*.vdb) Import
 - Volume Grids list field
 - Scale input field
 - Animation check box
 - Name drop-down menu
 - From and To input fields
 - Group Objects check box
 - Import to Project Location check box
- Assets
 - Node-based materials and Node networks can be stored as Assets
 - Save Assets dialog
 - Name: name of the Asset
 - Version tag: the version number of the Asset
 - ID: Asset ID
 - Database: the database the Asset will be stored in
 - Category: Asset Category (Color, Context, Conversion, Generator, Info, Material, Math, Shape, String, Surface, Uncategorized, Utility, New Category)
- General
 - Send to PictureViewer now supports all Viewport renderings (also OpenGL)
 - Camera 2D mode for the Viewport
 - New Export Selected Object as ... menu entry in the Object Manager
 - The Compositing Project File for Nuke now supports Alembic
 - New Viewport display modes for the Texture tag (Simple, Grid, Solid)
 - Improved UVs for Sphere (some types), Pyramid and Platonic
 - New Bake as Alembic and Bakes as Alembic + Delete commands
 - New command Save as Default Scene
 - Updated Visualize layout
 - New Multi-Passes
 - Direct Diffuse
 - Indirect Diffuse
 - Direct Specular
 - Indirect Specular

- Texture mode now works as the former Texture Axis mode. Texture Axis mode isn't available anymore.
- **MoGraph**
 - MoGraph Fields
 - MoGraph Fields replace falloffs in all areas where formerly Falloffs were used
 - Field Objects are Objects in the scene and can be freely placed and animated
 - Some Fields can have Sub-Fields, modifying one of their special parameters
 - Fields can write values into certain maps (Vertex Maps, Vertex Colors, Point/Edge/Polygon selections, MoGraph selections, MoGraph Weights)
 - Old falloffs are loaded as legacy falloffs, can be converted to Fields
 - MoGraph Fields UI allows for layering of Fields
 - Different Blend modes available (Normal, Min, Subtract, Multiply, Overlay, Max, Add, Screen, Clip)
 - Opacity slider
 - Value, direction (for certain Effectors) and color modification of each layer can be enabled/disabled
 - New Field Objects (Box, Capsule, Cone, Cylinder, Linear, Spherical, Torus, Formula, Python, Radial, Random, Shader, Sound, Group)
 - New Modifier Layers (Clamp, Color Filter, Colorizer, Curve, Decay, Delay, Formula, Freeze, Invert, Noise Remap, Python, Quantize, Rangemap, Remap)
 - New Field Layers (MoGraph Object, Particle Object, Point Object, Solid, Spline Object, Step, Time, Variable Tag, Volume Object)
 - Fields Interface
 - Blending tab: here are the Blending options that are also found in the Field Layer interface.
 - Field tab: here are the field-specific parameters of the object
 - Optional sub-fields tab: this tab offers a Field Layer UI for the sub-fields
 - Remapping tab: this tab holds the integrated remapping parameters of the Field value.
 - Color Remapping tab: this tab holds integrated remapping options for the Field color
 - Direction tab: this tab holds integrated remapping options for Field direction
 - Optional View Settings tab: this tab holds the Viewport settings for the Field
 - Field object interface
 - Same as Fields Interface, minus the Blending tab, plus Direction tab
 - Direction tab: Direction Mode drop-down menu (No Remap, Custom Direction, Attenuate by Strength) and Normalize Direction check box
 - MoGraph Cloner object now supports Multi-Instances
- **Motion Tracking**
 - Updated Motion Tracker layout
 - Simplified workflow to create a Motion Tracker object and to load the footage
 - Show dope sheet style data representation for selected track in the Graph Mode of Graph View.
 - The tracking direction can now be defined per keyframe
 - Tracks can now be frozen, to prevent them from being changed by other edits
 - New auto re-keying options automatically inserts a key whenever the 2D error reaches a certain threshold to improve tracking for tracks where the size or orientation of the surface changes significantly
 - New 2D Tracks editor mode
 - User Tracks list
 - Selected tracks are highlighted in the Cinema 4D standard way
 - Individual tracks can be renamed directly within the GUI
 - Full set of standard selection interactions supported
 - Ability for user to re-order tracks

- Multiple column data display to show the main track settings
 - Support for folders
 - Cursor navigation
 - Ability to delete track(s) using the Delete key
 - Pop up context menu with relevant controls.
 - Tracking direction indication in Graph View
 - Multi-selection and editing of mask vertices is now supported
 - New dockable Track Window that shows the zoomed view of a 2D Track
- SDK
 - C++
 - New MAXON API
 - Project tool
 - to generate project files for different operating systems
 - support (optional) style and syntax checks
 - Python
 - Integrated Python updated to version 2.7.14, including updated OpenSSL module
 - Script Manager: Python scripts can now also set the menu state, as it was possible in previous versions with C.O.F.F.E.E. scripts
 - Improved developer workflow due to better integration into external IDEs, including code auto completion
 - First exposure of MAXON API in Python