# ProBuilder 2.9.8f3

## Bug Fixes

- Fix shader compile errors when targeting mobile platforms.

- Fix possible overflow in vector hashing functions.

- Fix ProBuilderize failing to import quads in some cases.

- Fix FBX export not including manually unwrapped UVs.

- Fix toolbar using old icons with basic skin.

# ProBuilder 2.9.7f5

## Features

- Unity 2017.3 beta support.

- New toolbar icons (Right/Context + Click in Toolbar -> Use Icon Mode).

- Significantly improved quad detection in ProBuilderize function.

- ProBuilderize now able to import smoothing groups.

- Support exporting quads to FBX format (requires Unity FbxExporter in project).

- Newly redesigned `Smooth Groups Editor`.

- New `Select Face Loop` and `Select Face Ring` actions.

## Bug Fixes

- Fix possible null reference when picking ProBuilder objects.

- Fix "Select Hole" disappearing instead of showing as disabled.

- Fix "Extrude Face" disabled icon not matching current mode.

- Fix Standard Vertex Color shader preventing builds on some platforms when fog is enabled.

## Changes

- Don't show `pb\_Lightmapping` warnings by default.

- Smoothing groups may now extend beyond the 42 provided in the editor. Any smoothing group between 1 and 24, or greater than 42 is treated as a smooth face (currently only accessible in code).

- Set ProBuilder Standard Vertex Color shader fallback to "Standard."

# ProBuilder 2.9.5f3

## Features

- Deep selection support when clicking faces.

## Bug Fixes

- Drag select with "Select Hidden: Off" now works consistently in Unity 5.6 and up.

- Fix automatic lightmapping attempting to update while ProBuilder is modifying geometry.

## Changes

- Unity 4.7 and 5.0 are no longer supported (2.9.4 will continue to be available for these version of Unity).

# ProBuilder 2.9.4f1

## Features

- When a lightmapping finishes baking show a warning if any ProBuilder objects marked as Detail were left out due to missing UV2s.

## Bug Fixes

- Fix single key shortcuts emitting system beep on Mac.

- Fix vertex movement not respecting snap settings when ProGrids is placed in Plugins folder.

- Don't delete UnityEngine meshes when unloading a scene in play mode.

- Fix occasional crashes when using Select Hole and Fill Hole actions.

- Fix hang on opening context menu with very large projects.

- Fix Vertex Color Palette not applying colors correctly in vertex mode.

# ProBuilder 2.9.3f0

## Features

- Support exporting quads in OBJ format.

- Add a context menu item to quickly create material palettes from the current Asset window selection.

## Bug Fixes

- Use `additionalVertexStreams` mesh attributes where possible when ProBuilderizing.

- Fix for Windows version sometimes endlessly creating folders when root folder moved from Assets/ProCore.

# ProBuilder 2.9.2f1

## Bug Fixes

- Add file stubs for deprecated repair actions to prevent compilation errors when updating.

# ProBuilder 2.9.1f0

## Features

- New PLY model exporter.

- OBJ export rewritten, now supports:

- Multiple texture maps

- Vertex colors (MeshLab format)

- Texture map offset / scale

- Local or world space mesh coordinates

- PBR maps (http://exocortex.com/blog/extending\_wavefront\_mtl\_to\_support\_pbr)

- Improve Mesh Asset export dialog and options.

## Bug Fixes

- Fix ProBuilder preferences sometimes not loading.

- Fix deprecated method warnings in 2017.1 beta.

- Fix occasionally flipped UV axis on merged faces.

- Don't crash if ProBuilder folder has been renamed.

# ProBuilder 2.9.0f3

## Features

- Support for saving and loading custom Material Palettes.

- ProBuilder now able to store preferences per-project as well as globally.

- Significantly improve performance of Weld Vertices function.

## Bug Fixes

- Preferences Window now renders correctly in Unity 5.6 and up.

- Exit Bezier Shape editing when Esc is pressed.

- Quell unnecessary errors when ProGrids interface fails to load UnityEditor assembly.

- Fix potentially ambiguous reference to Axis enum in API examples.

- Fix mesh leak when exporting STL files.

## Changes

- Move pb\_Constant into ProBuilder2.Common namespace.

- Move pb\_Lightmapping class in EditorCommon namespace.

- Improve wording of warning when shortcut preferences are reset.

# ProBuilder 2.8.1f0

## Features

- Improve grid snapping when placing Poly Shapes.

- Add a callback when a mesh is rebuilt (pb\_EditorUtility.AddOnMeshCompiledListener).

- Remove max width limitation on Material Editor window.

## Bug Fixes

- Fix incorrect UV render scaling on retina and other scaled screens.

- Fix deprecated warnings on Handles calls in Unity 5.6.

- Fix Icosphere API example deprecated function calls in Unity 5.6.

- Fix UnityObjectToViewPos warnings Unity 5.6.

- Fix Poly Shape not generating UV2 for mesh.

- Catch an occasional Null Reference when viewing UV2 channel.

- Fix Null Reference in Poly Tool undo callbacks.

- Fix errors in adding pb\_Entity script during repair mesh references action.

- Improve consistency of Vector2/3/4 hashing functions.

- Fix particularly slow function in MergeFaces action.

- Fix preferences GUI layout.

## Changes

- Start Poly Shape height at 0.

- First Poly Shape click always sets pivot.

# ProBuilder 2.8.0f1

## Features

- New "Poly Shape" interactive shape.

- New "Bezier Shape" interactive shape.

- Unity 5.6 beta compatibility.

- Improve default UV layouts for new shapes.

- Add a shader for reference billboard planes ("ProBuilder/Reference Unlit").

## Bug Fixes

- Fix material editor applying to child transforms of selection.

- Fix instantiated objects not getting a UV2 channel when "Auto Generate UV2" is enabled.

- Material Editor now works with a relative path.

- Fix incorrect handle rotations in Element mode.

- About Window now loads even when not in \*Assets/ProCore/ProBuilder\*.

- Address a rare NullReferenceException when ProBuilder Editor is initialized.

- Don't spam Console with errors if update check fails to connect (only affects WebPlayer target).

- Add a more descriptive message to update check if connection fails.

## Changes

- Automatically toggle Detail Entity Type object's lightmapping static flag, preventing broken lightmap atlases.

# ProBuilder 2.7.0f7

## Features

- New redesigned "About" window.

- New "Check for Updates" window and menu item.

- Add a repair script to apply materials when upgrading from Basic to Advanced.

- Include option to restrict "Select by Vertex Color" to current selection.

- Add "Generate Shadow Volume" API example and action.

- Add preference to enable experimental features (current feature: Bezier shape).

- Add option to smooth round sides of cylinder in Shape Tool.

- Add repair script to strip and rebuild pb\_Object from Unity mesh.

- Add repair script for rebuilding shared index caches (addressed IndexOutOfRange errors in RefreshNormals function).

## Bug Fixes

- Fix inconsistent About Window behavior when importing updates.

- Make face highlight code snippet more robust in Runtime Editing example.

- Don't leave a progress bar behind if Probuilderize fails.

- Fix ProBuilder-ize adding pb\_Entity multiple times.

- Apply Quick Offset adjustments to all selected ProBuilder objects.

# ProBuilder 2.6.9f3

## Bug Fixes

- Fix vertex handles appearing offset when using an orthographic scene view.

- Mark KDTree Triangle and pb\_Stl as Any Platform in build targets.

- Fix compile errors in standard vertex color shader on Unity 5.5 on iOS

- Fix compile warnings in Unity 5.6.0b4

- Use multi-Unity-version compatible shader in Vertex Colors API example.

# ProBuilder 2.6.8f1

## Features

- Add option to restrict Select by Material to the current selection.

- Add alternate method of specifying torus radius dimensions.

## Bug Fixes

- Fix regression that broke iOS and Android build targets.

- Fix arch preview shape and built shape sides not matching.

- Fix issue where UV Editor could be out of sync with scene UVs after planar or box projection.

- Don't fail face or vertex picking when the required materials aren't found.

- Whenever a prefab change is detected rebuild the mesh.

- Fix null reference when attempting to bevel open edges.

- Remove unused and buggy Debug UVs shader.

# ProBuilder 2.6.7f4

## Features

- New face extrusion options to extrude along face normal, vertex normal, or per-face.

## Bug Fixes

- Fix potential drag selection inconsistencies when picking vertices in Unity 5.5.

- Fix bug where Backspace key in UV Editor with a GUI control focused would incorrectly register as a shortcut.

- Fix auto uvs rotating around handle pivot when using the rotate gizmo.

- Add undo for auto uv changes made by gizmos.

- Fix uv tiling toolbar not applying with mixed selection.

- Move pb\_Reflection to Editor so as not to be included in builds, fixing errors when targeting Windows Store. Remove unused ParseEnum<T> function in pbUtil for same reason.

- Retain smoothing group information when extruding.

- When flipping a selection of face edges where faces are not quads be specific about the reason for failing.

- Fix misc. potential hangs when registering ProBuilder objects for Undo.

## Changes

- Make default height segments for cylinder 0.

- Move some common class files into the Core folder so they're included with the Core lib instead of MeshOps.

- When grow selection by angle is off force iterative to on.

# ProBuilder 2.6.6f0

## Features

- Unity 5.5 support.

- Improve readability of Unity version -> ProBuilder package chart.

- Improve performance of mesh rebuild functions.

- Add API example showing how to highlight faces based on distance to a point.

## Bug Fixes

- Don't update mouse edge when not in geometry mode.

- Fix face and edge previews only rendering a subset of elements on meshes with high vertex counts.

- ProBuilder Editor doesn't need to be open to export meshes.

- Fix weird triangulation on Door shape.

Fix some incorrect calls to pbUndo.RecordObjects that could cause Unity to lock up with large meshes.

- Fix bug where "Export Mesh Asset" would always create an extra folder.

## Changes

- pb\_Object.Refresh now accepts a bitmask to enable/disable different component refreshes.

- Move Create ProBuilder Cube menu item to "GameObject/3D Object/ProBuilder Cube".

# ProBuilder 2.6.5f0

## Features

- Add procedural mesh extrusion example.

## Bug Fixes

- Fix bug where face/vertex picking with hidden selection off and intersect rect would not work in deferred rendering path.

- Fix bug when "Meshes are Assets" is enabled where exiting play mode would clear the mesh cache.

- Fix bug when "Meshes are Assets" is enabled where entering play mode would invalidate the mesh cache.

- Fix bug when "Meshes are Assets" is enabled where deleting a selection of pb\_Objects would leave orphaned cached meshes.

- Fix bug where UV2 channel of selected objects would be lost on scene save with "Meshes are Assets" enabled.

- Fix bug where stripping ProBuilder scripts with "Meshes are Assets" enabled would also delete the cached mesh asset.

- Fix incorrectly scaling slider control on retina display.

# ProBuilder 2.6.4f1

## Features

- Unity 5.5 Beta compatibility.

## Bug Fixes

- Fix bug where generating UV2 would incorrectly merge incompatible vertices in the optimization function due to vertex references not being unique when returning from GeneratePerTriangleMesh.

- Add icons for `Drag Selection Mode`.

- Add `Toggle Drag Rect Mode` icons.

- Fix selected vertex billboards not rendering in 5.5 beta.

- Fix crash when setting pivot with multiple objects selected.

- Fix setting pivot of a parent object moving children.

- Don't disable the object outline when Probuilder is open, but do disable wireframe.

- Fix prism shape height resulting in half-sized shapes.

- Add `Triangulate Faces` icon.

- Ensure icons are always imported with the correct settings.

- Fix "Generate Scene UVs" toggle not being respected in `Generate UV2` action

- Fix bug where drag selecting with shift in subtraction mode with complete rect selection would always deselect the entire selection.

# ProBuilder 2.6.3f4

## Features

- New `Vertex Positions Editor` provides fine-grained control over vertex postions.

- Add `Anchor` setting for Auto UVs to align faces before user transforms.

- When drag selecting faces add option to select by intersection. Toggle with menu item `Drag: Complete/Intersect`.

- New icons for `Select by {Material, Color}`.

- Significantly improve editor performance when drag selecting faces and vertices with `Select Hidden: Off`.

- New alternate drag selection modes: `Add`, `Subtract`, and `Difference` affects how the `Shift` key modifies selection when drag selecting elements.

## Bug Fixes

- Fix bug where using Undo in face selection mode could potentially delete faces on prefabs.

- Fix import settings on icons.

- Fix bug where `Fill Hole` would not correctly align normals after operation, sometimes also reversing neighboring face normals.

- Fix bug where `Fill Hole` would sometimes leave the filled faces with invalid edge caches (resulting in incorrect normals on extruding from the filled face).

- Added miscellaneous missing actions to documentation.

- Fix bug where drag selecting faces would sometimes leave the picker rect visible.

- Disable Select By Material/Color when no elements are selected.

## Changes

- Use Unity's default UV2 unwrapping parameters since they seem to produce generally better results than the padded params currently in use.

- New ProBuilder objects instantiate with `ShadowCastingMode.TwoSided` (configurable in Preferences/ProBuilder).

# ProBuilder 2.6.2f0

## Features

- Add STL file export support.

- Standard Vertex Color shader now compatible with Unity 5.5 beta changes.

- Add API Example showing how to set custom default UV2 Unwrap Parameters.

## Bug Fixes

- Fix bug where exporting OBJ would sometimes insert "AllFiles" into the file path.

- Fix drag selecting edges then bridging sometimes using the default material instead of a neighboring one.

- Fix compile error when using Fog with Standard Vertex Color shader.

- Fix console warnings in Unity 5.5.0b1

- Fix bug where `Select Edge Loop` would select too many edges.

- Don't show missing icon warnings unless in PB\_DEBUG mode.

# ProBuilder 2.6.1f0

## Features

- Add `Triangulate Face` action.

- Add ability to view UV2/3/4 channels in UV Editor.

- Add ability to edit per-object UV2 generation parameters in the Generate UV2 options menu.

- Improve performance of "Grow Selection" when flood selecting with angle restriction.

- Improve performance of some selection actions when in face mode.

- Add RenameNewObjects script to API examples folder (shows use of OnProBuilderObjectCreated delegate).

- Add "Select Faces with Material" and "Select Faces with Vertex Color" to the Selection menu.

- New options icon in toolbar: gear instead of triple lines.

## Bug Fixes

- Fix "About" window showing every changelog ever instead of just the latest.

- Fix bug in pb\_Math.Normal(pb\_Face) overload that would potentially return normals facing the wrong direction if fed ngons.

- Fix UV Editor incompatibilities with retina display on macOS.

- Fix bold label text color in Debug Window when Pro skin is used.

- Increase max allowed vertex handle size to 3 to accomodate macOS retina display.

- Fix import settings for `Center Elements` disabled icon.

- In ProBuilder-ize function don't bother showing 'include children' dialog if the top selection already contains all valid meshfilters

- Fix Advanced icon in PB Basic rendering blurry in toolbar.

- When freezing transforms also apply rotation in world space. Fixes some issues when freezing hierarchies of objects.

- Fix bug where edge ring would include faces with odd number of edges.

- Added "Fill Hole" and "Subdivide Edge" to documentation.

- Fix occasionally flipped face normals when connecting edges or vertices on n-gons.

- When connecting edges weed out any edges that don't connect to anything, preventing accidental edge subdivisions.

## Changes

- Make default angle error for uv2 unwrap a little higher to avoid bad unwraps in some common cases.

- Move ProBuilder-ize function to menu actions.

# ProBuilder 2.6.0f1

## Features

- Add `Bevel Edges` action.

- Add `Fill Hole` action to quickly insert a face in a mesh hole (with option to fully select and fill hole or just the selected parts).

- Completely rewritten documentation: http://procore3d.github.io/probuilder2/

- Add `Select Hole` menu action to quickly select the edges of any hole touching a selected vertex.

- Add a preference to disable "Precise Element Selection." When disabled edge and vertex modes will always select an edge or vertex no matter how far from the element they are.

- Add "Break Texture Groups" button to UV editor.

- Add non-manifold edge extrusion pref to Extrude Edge settings window.

- Replace mesh optimation functions with faster and more accurate versions.

- Improve performance of topology query operations (Grow Selection, Shrink Selection, Edge Loop, Edge Ring).

- `Center Pivot` action now available in Basic.

- Add Generate UV2 toolbar entry when "Disable Auto UV2 Generation" is enabled.

- Add a delegate in `pb\_EditorUtility` to notify subscribers when a new pb\_Object has been initialized.

- New API example `Tools > ProBuilder > API Examples > Log Callbacks Window` demonstrates hooking into various editor delegates.

- Adds an experimental new option to store Mesh objects as Assets in the project so as not to clutter the Unity scene file. Use with a prefab for maximum scene lean-ness. Enable this feature in Preferences/ProBuilder/Experimental/Meshes Are Assets.

- Add support for local/common toggles in Edge Debug mode.

- Add `Select Holes` action to editor toolbar (selects all connected open edge paths).

- `Connect {Edge, Vertices}` re-factored for speed and more robust edge case handling.

- New "Options" button for toolbar icons.

- Improve performance of `Delete Faces` action.

- Improve performance of `Subdivide` action.

- Add `Alt-S` shortcut for `Subdivide` action.

- Add option to `Mirror` action to either duplicate or move the selection when mirroring.

## Bug Fixes

- Fix some instances where modifying a mesh would result in NaN warnings.

- Fix icosphere audio example scene in ProBuilder Basic.

- Add `Center Pivot` action to menu.

- Bypass sRGB sampling for icons, fixing dark appearance in pro skin.

- Fix regression where switching between icon mode and text mode in toolbar would sometimes not immediately reload the toolbar.

- Fix an issue where meshes would be discarded and rebuilt on every instance id change, which Unity does a lot. The result of constant mesh rebuilds being invalidating the lightmap, making getting a decent bake very difficult.

- Ignore API examples in any build target that hasn't been tested (which is all of them save for standalones).

- Fix edge extrusion leaving black geometry when extrusion fails.

- Add extrude settings button to edge extrude toolbar item.

- Add a single context-sensitive Extrude shortcut so that super+e works properly in both edge & face modes.

- Fix 'KeyNotFound' exception when centering pivot sometimes.

- Fix UV3/4 assignment and getter functions reading out of bounds channel index.

- Fix Delete key notification not showing.

- Fix editor toolbar "leaking" due to incorrect hideflags in Unity 4.

- Fix cases where user could provide bad input to Arch generator.

- Fix `Weld Vertices` not welding vertices in some cases.

- Set detail pb\_Objects with ReflectionProbeStatic flags.

- Fix key shortcuts for hidden but enabled menu actions not working.

- Don't show hover tooltips if mouse is outside window bounds.

- Fix some edge cases in `Conform Normals` action.

- Fix `Grow Selection` itererative field incorrectly being disabled when "Grow by Angle" is off.

- Fix issue where n-gons with > 90 degree angles would not auto UV unwrap correctly.

- Fix some cases where subdivide would fail due to non-planar vertex positions on a face.

- Fix bug where extruding edges or faces would sometimes align the inserted face normals incorrectly.

- Hide geometry actions when in object mode.

- Fix edge selection when mouse is hovering an object not in the selection but a valid edge is within distance of mouse.

- Fix bug where subdividing a face with an adjacent concave n-gon would break the adjacent face.

- When generating the menu item text for shortcuts always use lower case, since Mac doesn't recognize upper case as shortcuts. Fixes an issue with shortcuts not working on OSX.

- Support cases where texture groups on pb\_Object aren't in linear order.

- Clear debug lines when a selected object is deleted.

- Fix bug where `Detach Faces` to submesh would incorrectly split all the detached selection vertices.

- Put UV Editor in namespace, preventing errors where common function names would be confused with other assets.

- In `pbUndo` use each individual object vertex count when deciding whether to diff or store object state for undo. Fixes hang when performing actions with small selections on large objects.

- Lower UV toolbar buttons by 1px when not using the Command GUIStyle since Button style adds 1px padding.

- When building ProBuilder delete user generated folders so that upgrades don't overwrite them.

## Changes

- Menu toolbar re-arranged for consistency.

- Remove UV2 generation parameters from pb\_Object.

- Add a public function for setting tangents on pb\_Objects.

- Deprecate GenerateUV2 extension method since mesh optimization is now an intertwined process.

- Improve hashing function in IntVec3 and Edge.

- Suffix pb\_Math.Approx functions to make implicit casting of vectors more difficult to do accidentally.

- Move "World Space" toggle up in the Auto UV editor

- In Auto UV mode rename the scale property `Tiling`.

- `Detach Selection` now behaves like toolbar option panel instead of popup.

- Remove unnecessary option to save duplicates of selected gameobjects when using `Merge Objects` action.

- In addition to changing the icon and text, also show a brief explanation of the current handle alignment mode in the tooltip.

- Move Mirror to object level, making it an action instead of panel popup.

# ProBuilder 2.5.0f0 (r4241)

## Features

- Toolbar redesign now adapts to both vertical and horizontal layouts (swap between Text and Icons by context clicking in the Inspector).

- New tooltips show inline documentation and keyboard shortcuts. Hold `Shift` to instantly view hovered tooltip, and turn off tooltips on hover in Preferences menu.

- New `Subdivide Edges` action inserts vertices along selected edges.

- GUI items are no longer stored in Resources. Changing the location of the ProBuilder directory is still supported.

- Add option to collapse vertices to the first selected vertex instead of always averaging.

- Mark the current mode and floating state in the toolbar context menu.

- Add preference toggle to disable Dimension Overlay lines.

- New Color Mask setting in Vertex Painter Editor enables painting only to specified component.

- Vector4 UV{3, 4} channels can now be stored in pb\_Object (use pb.SetUVs(index, List<Vec4>)).

## Bug Fixes

- Fix shortcut editor modifier keys not being correctly stored.

- Fix Freeze Transforms moving objects when selection contains hierarchies of meshes.

- Entity visibility toggles no longer interferes with Collisions, as well as remembers all manually changed object visibility.

- Fix Element Toolbar placement in Scene view on Retina display Macs.

- Fix UVs all being set to {0,0} when using Weld in the UV Editor.

- When extruding an edge check that the new face winding order is equivalent to the face of the donor edge and flip if necessary.

- Fix shortcut editor not recognizing all keycode values (notably Alpha0-9).

## Changes

- Remove option to display Mode Toolbar in the Inspector window.

- ProBuilder2.Math namespace removed, pb\_Math now belongs to ProBuilder2.Common.

# ProBuilder 2.4.11f0 (r4081)

## Bug Fixes

- Fix regression in 2.4.10f2 that broke assigning materials in ProBuilder Basic.

## API

- Add `onEditLevelChanged` delegate to pb\_Editor to notify other classes of edit level changes (Polybrush compatibility).

# ProBuilder 2.4.10f2 (r4027)

## Features

- Shape and Material windows are now dockable (context click in window and select Window/Set {Floating, Dockable}).

- Add "Snap to Face" shortcut when dragging the move tool (hold 'C' while dragging to snap tool to the nearest face).

- New ShaderForge compatible Standard Vertex Color shader on ProBuilder default material.

## Bug Fixes

- Unity 5.4 compatibility.

- Workaround for Unity crash "Check DisallowAllocation Error"

- Fix most cases of meshes going completely black when modifying them in any way.

- Fix NullRef error when scaling a single selected edge.

## Changes

- Remove various `Get{Vertices, UVs, Triangles}` functions from `pb\_Object`. Use `pbUtil.ValuesWithIndices` directly instead.

- Remove Instantiation API Example (there's nothing special about instantiating ProBuilder meshes anymore).

# ProBuilder 2.4.9f1 (r3978)

## Features

- New "Flip Edge" tool swaps the direction of a connecting edge in a quad.

## Bug Fixes

- Fix bug where Trigger or Collider entities could remain visible in play mode when using source.

- Fix slowdowns when inserting edge loops due to undo.

- Fix missing namespace errors in Unity 5.3.

- Increase the resolution with which vertex positions are compared to avoid incorrectly merging distinct vertices (often causing trouble when modeling at very small dimensions).

# ProBuilder 2.4.8f1 (r3764)

## Features

- Enable Set Pivot, Delete, and Vertex Painter in ProBuilder Basic.

- New Standard Shader with vertex color support (thanks to Unity Forum user @defaxer).

## Bug Fixes

- Add tooltips for every action in the ProBuilder toolbar.

- Fix consistent horizontal scrollbar showing in ProBuilder window.

- Smooth edges of curved stair sides, and align step UVs to match rotation.

- Use white text color in Dimensions Overlay when Unity Personal skin is used.

- Ensure DLLs retain GUID between releases, enabling simpler upgrades.

- Fix poor UV editor precision when working with small distances.

- Fix ~10px vertical offset image when rendering UV template in Unity 5.

- Fix slightly offset image when rendering UV template from docked UV Editor window.

## Changes

- Increase minimum allowed zoom in UV editor.

- Make warning shown when connecting edges or vertices fails a bit more descriptive.

- Don't show tangents and bitangents when Show Normals is enabled in the smoothing editor.

- Prototype becomes ProBuilder Basic.

# ProBuilder 2.4.7f0 (r3664)

## Changes

- New upgrade procedure skips complicated Upgrade Kit in favor of a slightly more manual but more reliable approach. See FAQ or ProBuilder Documentation for more information.

## Bug Fixes

- Fix possible null reference error when working with prefabs that have been duplicated.

- Additional error checking when stripping pb\_Objects from scene added.

- When ProBuilder-izing objects, ask user whether or not to traverse children.

# ProBuilder 2.4.6f0 (r3616)

## Features

- Add preference to set default Entity type.

- Add preference to set dedicated keyboard shortcuts for entering Object, Face, Vertex, and Edge mode.

- New Curved Stair generator, and stairs now produce manifold geometry.

- Add "Batch Upgrade" menu items to Upgrade Kit, allowing users to run one action for an entire project.

- New GUI slider allows un-clamped input to the float field in Shape Tool.

## Bug Fixes

- Alt + E shortcut now works with only 2 vertices selected.

- Fix bug where colliders would be incorrect when instantiating trigger entities.

- Fix some cases where "Connect" would result in incorrect geometry.

- Fix UV editor not recognizing shortcuts sent from scene view.

- Fix occasional "Non-finite value in mesh vertices" error when extruding.

- Account for inconsistently sized vertex color arrays when ProBuilder-izing meshes.

- Fix null reference errors when Shape Creation Tool is open with preview enabled and a script reload takes place.

- Fix null reference sometimes caused by a Mirror action.

- Fix bug where merging objects would always add a MeshCollider, even if one already exists.

- Fix mesh bounds not refreshing when adjusting vertices with Quick Offset tool.

- Fix mis-calibrated drag selection wwhen first entering element mode after moving an object.

- Fix issue where duplicating GameObjects with child pb\_Objects would leave references to original meshes intact, resulting in odd behavior when deleting objects.

- Fix bug where prefabs would not "Apply" changes to all children equally.

- Improve performance when editing scenes with many ProBuilder object prefabs.

# ProBuilder 2.4.5p0 (r3531)

## Bug Fixes

- Fix bugs in Copy UV Settings and Quick Apply Material shortcuts.

# ProBuilder 2.4.5f1 (r3519)

## Features

- New Torus shape.

- Greatly improve editor performance when working with medium to large meshes.

- New skin for scene info label, including more data about selection.

- Automatically batch vertices even if they don't belong to a smoothing group (actual mesh vertex is now shown in scene info box).

- Add mesh dimensions overlay (ProBuilder > Object Info > {Show, Hide} Dimensions Overlay).

- Make vertex colors button extend-able, with the option to set which color editor the shortcut should open (Palette or Painter).

- New option to show element/object mode toolbar in scene (default), including positioning parameters.

- Improve vertex painter performance with large meshes.

- Unity 5.2 compatibility.

## Bug Fixes

- Fix bug where reverting a prefab with non-prefab ProBuilder children would throw errors.

- Fix hangs when performing various actions.

- Merge now retains the GameObject properties of the first selected object.

- Axis snapping with ProGrids now translates correctly when object rotation is non-identity.

- Performance improvements in UV editor for large meshes.

- Fix bug where OBJ exporter wouldn't properly write submeshes.

- Fix one possible cause of "Mesh.{uv, colors} is out of bounds" errors.

- Catch null reference errors when creating wireframe overlays for meshes exceeding Unity's max vertex count.

- Fix issue where Merge objects would cause meshes to lose their graphics, requiring a refresh.

- Fix menu items showing as enabled when not applicable.

- Add pb\_Entity in ProBuilderize if the RequireComponent attribute fails to do so.

- Fix bug where ProGrids wouldn't affect elements when PB is built to a DLL.

- Fix bug where the cube shortcut would ignore material preference.

- Fix vertices merging incorrectly in Optimize function when colors don't match.

- Recalculate mesh bounds after moving the pivot.

- Always refresh/rebuild meshes after making them assets, fixing issues with duplicate mesh references.

- Fix a few more causes of leaks in the mesh and line rendering systems.

- Fix bug where scaling a new object in the shape tool wouldn't take effect until after first refresh.

- Fix bug where Insert Edge Loop and ConnectEdges would sometimes select too many edges after application.

- Fix ProGrids over-zealously collapsing vertices when in axis snapping mode.

- Correctly set element toolbar position when toggling between scene and editor window placement.

- Re-enable user set vertex handle color preferences.

## Changes

- Move default textures out of resources folder.

- On pb\_Object::Start, call ToMesh before Refresh since Refresh could try to set UVs or Colors to a mesh that has inconsistent vertex counts.

- Remove most functions accepting a pb\_IntArray[] sharedIndex cache and replace with Dictionary versions.

# ProBuilder 2.4.4p1 (r3425)

## Features

- Add scale shortcut toolbar for Auto UVs.

- Add Control+Shift+Left-Click when UV editor is open to copy auto UV settings (including texture).

## Bug Fixes

- Fix errors when building a project with geometry containing null materials.

- Fix rare null reference error when switching scenes.

# ProBuilder 2.4.4f1 (r3385)

## Features

- Where possible\* indices are now collapsed to share a single vertex.

- Add context menu to swap between dockable window modes in vertex painter.

- Unity 5.1 beta compatibility.

- New Icosphere shape.

- New API example shows a deformed icosphere with FFT spectrum.

- Grow Selection is now roughly one gajillion times faster.

- Grow with Angle can now optionally select all faces on a plane instead of just the ones near the perimeter.

- New vertex handle gizmos are now culled (and much faster).

- Add option to select only visible elements (Select All or Select Visible toggles this).

- New Repair/pb\_RepairMeshReferences script fixes duplicate mesh references.

- Improve edge selection logic, making edge selection much easier.

- Add a preference to enable backface selection on meshes.

- Re-enable 'NoDraw' faces (now implemented as a shader replacement at compile time).

- Improve subdivide action performance.

- Improve performance when editing large numbers of vertices.

- Smooth Normals Window now displays vertex normals with culling, and much faster.

- Repair Missing Script references is now cancelable.

- Add option to extrude elements as a group or individual.

## Bug Fixes

- Improve Flip Normals shortcut selection context handling.

- Enable Subdivide shortcut in Top mode.

- Fix arch geometry that broke when subdividing caps.

- Fix bug where setting arch radius would also set the thickness to 0.01.

- Add option to toggle cap generation on/off in arch tool.

- Fix bug where extruding multiple adjacent faces with a shared center point would not correctly translate the shared center vertex.

- Fix bug where Smoothing Window would not repaint on selection change.

- Improve performance of MergeVertices function, helping to address lag after modifying large objects.

- Fix bug where selecting faces obscured by a culled face would sometimes not register.

- Remove obsolete preference entries.

- Add Undo support when a click drag changes the selection in the UV editor.

- Fix 'Quaternion Look Rotation is Zero' log spam when a face contains degenerate triangles.

- Fix most instances of mesh and material leaks in Editor.

- Fix bug where applying prefab changes to pb\_Objects with the Editor closed would not propogate changes to instances.

- Hide some internal MonoBehaviours from the Scripts menu.

- Fix bug where deleting a face with 'delete' key shortcut would change static flags.

- Fix null ref when entering play mode with collider entities sporting boxcollider components.

- Fix bug where Connect Vertices would fail on thin isosceles triangles.

- Fix bug where Connect Edges would mangle adjacent long skinny faces.

- When adding colliders via pb\_Entity toolbar, scan current collider components for isTrigger values and apply to new collider if found.

- Fix some instances where convexity and trigger for EntityType.Collider & EntityType.Trigger types would not be set on initialization.

- When detaching faces to a new object, make the detached object selected.

- Fix bug where exiting to Top or Plugin level would not clear the selection mesh.

- Copy userCollisions field when serializing pb\_Object.

- Fix regression in Unity 5 that causes prefabs to lose instance modifications on save and entering playmode.

- When mirroring objects, make the mirrored results the new selection.

- Fix bug where setting entity type then undoing wouldn't catch changes to collider.

- Fix bug where duplicating multiple objects would leave pb\_Object references pointing to same object.

- When probuilder-izing objects, perform the action in-place (and add undo support).

- Catch errors when repairing missing script references on objects with null materials.

## Changes

- Remove dependency on ProCore lib to communicate with ProGrids.

- Rename scripts to uniformly follow pb\_ prefix and pascal case for runtime, underscore case for editor.

## API

- New `Optimize()` method calls CollapseSharedVertices and GenerateUV2. Replaces GenerateUV2() in most cases.

- Move most of remaining scripts into proper namespaces.

- ProBuilder2.GUI namespace become ProBuilder2.Interface to avoid conflicts with UnityEngine.GUI.

- Move Triangulation code into pbTriangleOps.

- Significantly improved performance of RefreshNormals() function.

- New VerifyMesh() function in pb\_EditorUtility guarantees good mesh reference and geometry.

- Add ability to delete unfixable components in pb\_MissingScriptEditor.

- New PointIsOccluded() check in pb\_Handle\_Utility tests if a point is visible in editor.

- Significantly improve performance of pbUtil.RemoveAt().

- Significantly improve performance of many pbMeshOps methods.

- New pb\_LineRenderer and pb\_MeshRenderer provide fast gizmo drawing in the SceneView.

\* Vertices must be smoothed, and have the same texture coordinate to qualify for weld.

## f1 Patch Notes

- Fix ProGrids not affecting vertices / faces / edges in Edit mode.

- Minor tweak to vertex handle color.

# ProBuilder 2.4.3p0 (r3216)

## Features

- Weld distance now adjustable in UV editor.

## Bug Fixes

- Fix weird arch geometry near caps, noticeable when inserting edge loops.

- Improve 'Flip Normals' shortcut context awareness.

# ProBuilder 2.4.3f0 (r3202)

## Features

- Add preference to enable back-face selection.

## Bug Fixes

- Remove 'here' console log.

- Fix regression in 2.4.0 that broke Undo when used with ProGrids.

- Fix 'Look Rotation is Zero' console logs when selecting a face with degenerate triangles.

- Fix bug where sometimes clicking a face would not register due to a culled face intercepting the raycast.

# ProBuilder 2.4.2f0 (r3202)

## Features

- New debug window visualizes mesh information in the sceneview.

## Bug Fixes

- Fix regression that broke prefab editing applying to instances.

- Fix latency in SceneView when selecting elements in the UV window.

- Fix bug where selecting elements in the UV window would not Undo correctly.

- Fix regression that caused UV handle to not update its position when right-click dragging.

- Fix bug where texture rotation handle in the scene view would not snap correctly on finishing a UV adjustment.

- Fix bug where drag selecting edges or faces could select elements behind the scene camera.

# ProBuilder 2.4.1f1 (r3174)

## Features

- New "Export UV Template" function saves a PNG of your UV maps.

- Add new preference to show object vertex, face, and triangle count in the scene view (Preferences/Show Scene Info).

## Bug Fixes

- Edge wireframe no longer renders the material preview wells.

- Fix performance issues when editing large objects in the UV editor with Auto UVs.

- Fix bug where 'Push to Grid' from ProGrids would not Undo correctly.

- Fix lagging wireframe when running "Freeze Transforms" action.

- Fix null ref when deleting multiple faces.

# ProBuilder 2.4.0f4 (r3132)

## Features

- Unity 5 support.

- New wireframe shader overrides Unity default when ProBuilder Editor is open.

- New 'Merge Faces' geometry action combines selected faces to a single face.

- Add `Missing Script Reference` repair item.

- Show color name in vertex tools instead of RGBA info.

- When creating an mesh Asset, also create a prefab with the new mesh and materials already wired up.

- Cull hidden edges when in Edge mode.

- Fix spotty face selection highlight rendering when using Deferred Rendering.

- Add preference to disable automatic UV2 generation while modeling (improves editor performance).

- When selecting a texture-grouped face in UV editor, show an indicator of all faces in group.

- Improve performance when modifying geometry & UVs in Unity 5.

- New dark background in UV editor for Unity light skin users.

- Improve performance when selecting objects with large vertex counts.

## Bug Fixes

- Fix crash when a face material is null (defaults to Unity Default-Diffuse).

- Fix incorrect results when extruding multiple faces sharing a single center vertex (usually seen on the top of a cylinder).

- Save vertex colors when ProBuilder-izing a mesh.

- Fix occasional null ref when continuing UVs.

- Support Undo in UV Editor Auto panel.

- Support Undo for `Push to Grid` events from ProGrids.

- Fix occasional `Index out of range` errors when subdividing, triangulating, and setting pivot.

- Fix crash when running `Fix Missing Script References` in Unity 5.0.0b18 (big thanks to Michael N!)

- Improve the performance of Planar Mapping manual UVs.

- Create Material data asset path if it doesn't exist (fixes errors when saving Material preferences).

- Fix bug where dragging UVs in Unity 5 would sometimes corrupt the mesh.

- Disable Continuous Baking when dragging elements or making continuous changes to the mesh, fixing corruption issues in Unity 5.

- Fix occasional erroneous error message when subdividing faces.

- Fix null ref error when Auto UV panel is open with nothing selected.

- Allow `V` key usage when not in Element mode.

- Fix regression where instantiated objects would not respect ProGrids alignment.

- Fix leaks when deleting or duplicated pb\_Objects.

- Fix occasional null ref errors when welding or collapsing vertices.

- When double-clicking a texture grouped face in UV editor, select the entire group.

- Fix regression that caused performance spikes when deleting or instantiating objects.

- When detaching faces to a new object, copy all of that objects properties.

- Add Undo support to Shape creation tool.

- Fix bug where running Flip Normals from the Menu would not immediately update the mesh graphics.

- When serializing pb\_Objects, save color and material information (materials are now loaded by name).

- Fix bug where the texture handle tool would sometimes (most times) move UVs in the wrong direction.

- When entering Texture Blending mode in Vertex Painter, set the color to a solid variant of one of the available textures.

- Fix bug where projected UVs in manual mode could potentially be placed very far from the current handle.

- Fix lag when drag selecting edges on objects with large vertex counts.

- Fix bug where setting entity type would not immediately refresh the mesh.

- Fix minor edge selection bug that would break edge highlighting when not directly hovering a mesh.

- Improve appearance of Grow and Extrude foldouts in editor window.

- Fix bug where clicking on a vertex could sometimes select the object behind it.

- Fix compile errors when building to WebGL target.

- When creating a mesh asset, ensure that the source object mesh is not referenced by the new mesh asset.

## Changes

- Remove 'NoDraw' feature (necessary for Unity 5 compatiblity).

## Beta

- Rudimentary Boolean tool added - this is very early in development.

## Bug Fixes (since 2.4.0f1)

- Fix issue where "Repair Missing Script References" script could get stuck on prefab instances.

- Silence cast exception error in pb\_Object\_Editor.

# ProBuilder 2.3.3f1 (r2970)

## Features

- Significantly improve performance of Subdivide action.

## Bug Fixes

- Fix incorrect language in Plane generator.

- Fix bug that resulted in mangled vertices when Welding.

# ProBuilder 2.3.2f2 (r2947)

## Features

- Add a toggle in pb\_Entity to turn off automatic collision generation.

- Improve UV editor grid logic (now follows camera and resizes at far zoom levels).

- New PostProcessor automatically strips ProBuilder scripts when building executables (toggle-able in Preferences).

## Bug Fixes

- Respect ProGrids `X` key shortcut when translating faces.

- Fix build errors with Static Batching enabled.

- When applying Smooothing Groups, if no face is selected apply group to entire object.

- Static Flags now initialized with `Occluder Static` unchecked.

- Pressing 'F' while a single vertex is selected no longer frames the entire object.

- Vertex colors are now copied when stripping ProBuilder scripts.

# ProBuilder 2.3.1f1 (r2900)

## Features

- New Vertex Painter tool.

- New 'Triangulate ProBuilder Object' action for facetized poly-world look.

- Significantly improve UV editor performance when drawing many elements.

- ProBuilderize action now preserves UVs.

## Bug Fixes

- Fix error when opening Material Editor after assigning a Substance Material.

- Fix bug that caused pb\_Editor to freeze when editing prefabs made from ProBuilder objects.

- Remove prefab dependency on ProBuilder.Instantiate or RebuildMeshOnWake.

- Fix mesh leak in Shape Tool.

- Enable Alt+NumKey material shortcut when in Object level.

- When shift-extruding faces in Edge mode, default to face extrusion over edge.

- Fix leaking mesh and material in Face editing mode.

- Fix install script bug that would incorrectly delete non-ProBuilder files.

## Changes

- Handle position is now calculated as the center of selection bounding box.

## API

- New 'HueCube.cs' API example script demonstrates changing single vertex colors.

- New 'pb\_SerializableObject' class provides serializable storage for ProBuilder objects. Add 'pb\_Object::InitWithSerializableObject' constructor.

## Beta Notes f1

- Fix install script bug that would incorrectly delete non-ProBuilder files.

## Beta Notes f0

- New Vertex Painter tool.

- Fix error when opening Material Editor after assigning a Substance Material.

- Handle position is now calculated as the center of selection bounding box.

# ProBuilder 2.3.0f14 (r2861)

## Features

- New UV Editor window.

- New 'Material Editor' window for quickly applying materials to ProBuilder objects.

- Completely redesigned ProBuilder EditorWindow. Dynamically displays only relevant action buttons.

- Editor: New 'Select Edge Loop' command (double click on an edge, or shift+double click to ring selection).

- Editor: New 'Detach to Object' action creates a new ProBuilder object from a face selection.

- Editor: New 'Shrink Selection' command.

- Editor: 'Invert Selection' command now works for Edges and Vertices in addition to Faces.

- Editor: Performance improvements when editing large meshes.

- Editor: 'Grow' settings allow for a user set maximum angle between adjacent faces to limit selection growth.

- Editor: New extendable GUI settings for 'Extrude' allow for user-set extrusion distance.

- Editor: Add 'Distance' setting to Weld tool.

- Editor: Remove requirement that all pb\_Objects be scaled to (1,1,1).

- Editor: Add context menu to swap between floating / dockable windows.

- Editor: New 'Conform Normals' geometry operation.

- UV: New 'Continue UVs' action. With the UV Editor open, select a face then Ctrl + Click an adjacent face to seamlessly match UV coordinates.

- UV: Right click translation handle in UV editor to set a new pivot point (Ctrl snaps to grid, Shift key disables proximity snapping).

- UV: Merge Auto UV and Manual UV editors to a single ALL POWERFUL editor window.

- UV: New Box projection UV unwrapping.

## Bug Fixes

- Editor: Fix bug where toggling NoDraw would sometimes fail.

- Editor: Fix issue where Undo would sometimes cause actions immediately following to fail with 'Index Out of Range' exceptions.

- Editor: Fix Quick Apply Texture shortcut regression from last version.

- Editor: Fix bug that caused 'Undo Change Face Seletion' to delete faces.

- Editor: Fix bug where ProBuilder.Instantiate() would not properly traverse prefab hierarchy when initializing ProBuilder objects.

- Editor: Catch yet another 'Look Rotation is Zero' warning that would slow the editor to a crawl.

- Editor: Fix inconsistent Undo operations on Unity 4.3+ installs.

- Editor: Catch NullRef errors when dragging non-Material type objects into the SceneView.

- Editor: Fix NullRef errors on 'Connect Vertices' actions with multiple faces selected.

- Editor: Fix bug where handle rotation with multiple vertices and no faces selected would be incorrect, resulting in strange behavior.

- Editor: Fix bug in QuickStart script that would install Unity3.5 DLLs for Unity 4.3+ versions, breaking Undo operations.

- Editor: Fix ProBuilder SceneView toolbar positioning when Deferred Rendering is active.

- Editor: Improve Edge selection consistency.

- Editor: Fix incorrect zoom behavior with fewer than 2 vertices selected.

- Editor: Fix 'Set Pivot' moving selected pb\_Objects all ova' the place.

- Editor: Fix regression that broke Lightmap channels on Prefab objects.

- Editor: Frame selection now takes all selected pb\_Objects into calculations.

- Editor: Fix regression which broke instanced Prefab geometry when running "Apply".

- Editor: Implement 'Undo' when drag selecting elements.

- Editor: Window now implements a scroll bar when necessary.

- Editor: Switching to Rotate or Scale tool no longer resets the handle alignment to 'Local'.

- Editor: Fix bug where Subdivide / Connect Edges / Connect Vertices would not set the selection to match the newly created sub-objects.

- Editor: Fix Mirror Tool incorrectly placing mirrored object pivots.

- Editor: Fix bug where sub-object selection highlights would be left behind when modifying an object's transform via Inspector.

- Editor: Always refresh an object's materials when Undoing modifications to the SharedMaterial array.

- Editor: Face selection graphic now sits flush with faces.

- Editor: Fix bug where ProBuilder-ized meshes would instantiate disabled.

- Editor: Fix incorrect behavior when scaling multiple ProBuilder objects at once.

- Editor: When exiting AutoUV mode (formerly Texture Mode) remember the previous Edit Level, Selection Mode, and Handle aligment.

- Editor: Fix 'Weld Vertices' action failing to properly compare all vertices.

- Editor: Fix incorrect behavior when attempting to modify pb\_Objects with children, or children of pb\_Objects.

- Editor: Replace deprecated code for Unity 5.

- Editor: ProBuilder-ized objects now inherit donor mesh name.

- Editor: Catch null-ref when closing pb\_Editor with Smoothing Window open.

- Editor: Register Undo when creating new objects (with Merge or Mirror actions).

- Editor: When Alt key is held, do not allow handles to capture mouse.

- Editor: Fix leaking mesh preview object when entering Playmode.

- Editor: Allow submeshes to reference Null materials.

- Editor: Fix z-fighting face highlight in Deferred Rendering path.

- Editor: Setting EntityType is now undo-able.

- Editor: Fix bug where extruding from faces would not inherit the correct winding order.

- UV: Retain UV modifications when Subdividing, Connecting, or otherwise noodling around with a face.

## Changes

- 'Top' and 'Geometry' modes become 'Object' and 'Element', respectively.

- Remove drill-down interface for pb\_Object dimensions in favor of just always showing them.

- No longer show element highlights when generating shape previews.

- Smoothing editor now accessible via main Editor window and Menu items.

- Remove Lightmapping window shortcut button from Editor window.

- When setting a pb\_Object to EntityType::Trigger, also toggle 'isConvex' on the collider.

- Texture Window becomes AutoUV Window, and no longer houses material placement tools (Material Editor window replaces this functionality).

- Smoothing Editor Normals is now a float field, allowing users to set the size of debugging mesh normal lines.

## API

- Move all menu and editor commands to pb\_Menu\_Commands class.

- Add ProBuilder::Instantiate(GameObject go) overload.

- Slightly improve pbMeshUtils::GetConnectedFaces() performance (still incredibly slow).

- New methods for caclulating point inclusion for complex polygons in pb\_Math.

- pb\_Handle\_Utility is new and has some super cool stuff in it, and I think I forgot to mention it in the last changelogs.

- Add a Repair script to fix missing UV or Vertex caches.

- Improve performance of `GetUniversalEdges` by approximately 3x.

- Move `ProjectionAxis` to `pb\_Enum`, and it's associated methods to `pb\_Math`.

- Remove `ProjectionAxis.AUTO`, add entries for all other axes.

- New pb\_Material\_Editor window.

- New pb\_Bounds2d class adds some functionality for AABB calculations.

- Improve frequency of expensive caching in pb\_Editor.

- Removed most naughty words from the codebase.

- New pb\_MenuCommands class synchronizes behavior between MenuItems and Editor buttons.

## Beta Notes: f14

- Editor: New 'Conform Normals' geometry operation.

- Editor: Fix bug where extruding from faces would not inherit the correct winding order.

- API: Add new 'GetWindingOrder(pb\_Face face)' extension for pb\_Object.

## Beta Notes: f13

- API: TranslateVertices now operates in local space. Add TranslateVertices\_World for backwards compatibility.

- API: Extrude now optionally outs the appended faces.

## Beta Notes: f12

- Change "Ledge Height" to "Door Height" in Door creation panel.

- Omit Entity information from instantiated pb\_Object's name.

- Fix bug where duplicate faces could be selected when using Grow Selection without an Angle parameter set.

## Beta Notes: f11

- Fix sometimes incorrect results when selecting UV islands.

- Show UV popups in UV Editor window.

## Beta Notes: f8

- Fix bug where faces with flipped normals would extrude with incorrect winding order.

- Merge Entity and Visgroup toggles.

- 'J' key toggles UV editor open / closed.

- Visgroup status is now retained during playmode state changes.

# ProBuilder 2.2.5f5

## Features

- Add 'Arch' tool to Shape Creation Panel.

- New parameters for Door shape generator.

- New 'Selection / Select All Faces with Material' menu item.

- Add a Selection menu item to select all faces with current material.

- New live information update show face movement information.

- Fancy new install script automatically detects previous installations and forgoes the need for user interaction in most upgrade cases.

## Bug Fixes

- Fix inconsistent Undo for face selection on ProBuilder objects.

- Clean up Shader warnings on initial import.

- Fix ProBuilder.Instantiate() ignoring position and rotation parameters.

- Don't force rename objects when changing the Entity type.

- Fix face selection highlight being incorrectly affected by Fog.

- Fix bug where handle alignment preference would be lost occasionally.

- Fix bug where Grow Selection (non-planar) would allow duplicate faces to be selected.

- Fix bug where prefab objects would throw "Shader wants normals" warnings and sometimes not initialize in scene.

- Fix issue where UV2 channel would not correctly initialize on prefab objects.

- Fix bug where rapidly clicking to add faces would frequently result in the deselection of all faces.

- Fix bug where MirrorTool would incorrectly affect source object's transform.

- Fix duplicate and mirrored objects affecting the original mesh geometry.

- Fix null-ref error when using Edge Ring tool on a non-circuital ring.

- Fix bug where mesh colliders added via Entity component menu would incorrectly have the 'Convex' flag toggled.

- Fix bug that caused mirrored objects to lose the source object's entity type.

- Remove the ability to select non-ProBuilder objects when in Geometry or Texture mode (toggle-able via ProBuilder/Preferences).

- Lower distance threshold for mouse distance to line to be considered selectable.

- Fix bug that broke scaling objects when not in PB editor.

- Fix regression that broke deep copying objects when duplicating or copy/pasting.

- Clean up Shape Creation interface to consistently show build button at bottom of screen, and provide scroll bars when necessary for parameters.

- Duplicate entire GameObject (including attached components) when running 'ProBuilder-ize' action.

- Fixed bug with cone shape generation not using radius parameter.

- Enable NavMeshStatic and OffMeshLinkGen flags by default on new pb-Objects.

- Add pb\_Object component check in addition to pb\_Entity check in Repair / Validate Components.

- Fix install script breakage on Unity 4.3+

- Fix Mirror Tool incorrectly modifying donor object's normals.

- Fix issue where applied changes to ProBuilder prefabs would not immediately update all other instances.

- Fix inconsistent extrusion with Edge and Vertex selections.

- Fix bug where TextureWindow would not initialize with current selection.

- Automatically clean up degenerate triangles caused by vertex merge/weld operations.

- Enable 'Push to Grid' support for ProGrids users with vertex, edge, and face selection.

- Fix bug that caused vertices behind the scene camera to be selected incorrectly in some cases.

- Fix object incorrectly instantiating off-grid with strange pivot placement.

- (Beta) Rename AboutWindow to avoid namespace conflicts.

## Changes

- Rename 6by7 root folder to ProCore.

- New ProCore.dll replaces SixBySeven.dll (shared classes between ProCore products).

## API

- pb\_Object.SelectedTriangles is no longer guaranteed to contain only unique indices.

- Convert pb\_Preferences\_Internal::GetEnum<> to use ints instead of strings, modify pb\_Editor to match.

- pb\_Object.SelectedTriangles is no longer guaranteed to contain values corresponding to uniqueIndices array.

- Remove deprecated pb\_Face::DeepCopy. Implement copy constructor.

- Move many of ProBuilder's classes to namespaces (ProBuilder2.Common, ProBuilder2.MeshOperations, etc).

- New ClassesEditing segment of Classes folder contains all non-essential files. This allows for a single ProBuilderCore.dll that can be redistributed with ProBuilder objects allowing users without ProBuilder to view and load ProBuilder objects.

# ProBuilder 2.2.4f0

## Bug Fixes

- Fix 'Null Reference Error' when editing objects at runtime.

- Fix crash at runtime when ProBuilder object is selected.

# ProBuilder 2.2.3f0

## Features

- New 'Grow Selection Plane' which expands the selected face to nearby faces on the same plane.

## Bug Fixes

- Fix regression where handle tool would not default to Top level editing in Geometry mode when no vertices were selected.

- Fix bug where colliders would be lost on upgrading PB install.

- Enable multi-object editing for pb\_Entity inspectors.

## API

- Move and rename pb\_Object::MeshWithMesh to pbMeshUtils.DeepCopyMesh.

- Fix PlaneNormal not returning a normalized vector (yikes!).

# ProBuilder 2.2.2f4

## Features

- New 'Texture Groups' UV setting. Select faces and group to project seamless UVs.

- New 'Make Asset' Action allows users to save ProBuilder objects as Mesh objects.

- New 'Subdivide' command.

- New 'Connect' command (edges, faces, vertices).

- New 'Insert Edge Loop' command.

- New 'Select Ring' command.

- New 'Grow Selection' command (Alt-G).

- Significant performance improvements when working with large objects.

- New preferences to set vertex handle colors and size.

- Improve performance when drag selecting edges.

- New 'Remove Degenerate Triangles' Repair menu item.

- New snap to nearest vertex feature. When moving vertices, hold 'V' to snap handle to nearest vertex.

- New 'Quick Offset' tool in pb\_Object inspector window. Set a value and immediately move the selected vertices by that amount (thanks to Matt1988 for initially developing this feature).

## Bug Fixes

- Override Frame selection to focus on only selected vertices (thanks @nickgravelyn for this tip).

- Fix inconsistent keyboard shortcuts on Mac.

- Tool buttons are now respected by ProBuilder handle.

- Fix bug where ProBuilder GUISkin wouldn't correctly initialize when left open during a Unity restart.

- Fix bug where double clicking a pb\_Object to select all would not properly select all Edges.

- Fix bug where ProBuilder would affect other EditorWindow GUI layouts.

- Fix bug where Mirror Tool would fail to correctly initialize objects with pb\_Entity.

- Drag selection box now more closely matches Unity's default drag box.

- Update and improve ProBuilderize Action (now attempts to create faces instead of just triangles).

- Fix Rotation handle incorrectly updating to match selection when dragging (occasionally throwing Quaternion.LookRotation == Zero warnings).

- Fix Scale tool incorrectly using world coordinates when translating vertices.

- Fix weird Prism geometry.

- Fix bug where setting an object pivot with ProGrids enabled would sometimes move the object's vertices off grid.

- Edges may now be shift-deselected.

- Update Undo defines to check against Unity versions 4.1 -> 4.9.

- 'Use' events when shortcuts are detected. Seems to work about 60% of the time on Mac.

- Fix bug where pivot would instantiate offset from grid when used in conjunction with ProGrids.

- Fix bug that broke OBJ export when attempting to export more than one model per session.

## Changes

- Vertex Color shortcuts are now declared in ProBuilderMenuItems, allowing users to edit them without installing Source.

- Reorganized Menu structure.

## API

- Selection management at object level is now entirely set in pb\_Object, using new SetSelected[Faces, Edges, Triangles].

- New naming and placement guidelines for Menu items (see pb\_Constant).

- New ShiftExtrude() method in pb\_Editor removes duplicate code in Handle functions.

- New pb\_Editor\_Graphics class replaces calls to UnityEngine.Handles in pb\_Editor.

- Move most MenuItems to ProBuilder2.Actions namespace (exceptions being Windowed items).

- New pbUndo class replaces #if > UNITY\_4\_3 junk.

# ProBuilder 2.2.0f4

## Features

- Update Undo code for Unity 4.3 compatibility (Install Interface will determine the correct package for your Unity version automatically).

- Add Rotate and Scale tool when editing faces or vertices (accessed by 'E' and 'R' shortcuts, respectively).

- Add EditLevel toolbar in sceneview for quickly viewing and setting EditLevel. @Genstein suggested improvement.

- New Edge selection mode.

- New 'Bridge Edges' action. Selected 2 edges to create a face bridging them.

- New 'Collapse Selected Vertices' action. Select any number of vertices and merge them to a single point.

- New 'Split Selected Vertices' action. Splits the selected vertices.

- New 'Weld Selected Vertices' action. Checks if any selected vertices share a point, and if so, merge them.

- New 'Invert Selection' action. (ProBuilder -> Edit -> Invert Selection).

- New 'Extrude' action (ProBuilder -> Edit -> Extrude). Works for single or multiple faces, as well as edges. Hold shift while moving a face to automatically extrude (works for translate, rotate, and scale).

- New Install / Upgrade interface provides options to install Release and Source versions, as well as older packages.

- Source code is now included as an installation option.

- New Door primitive type in Shape Generator.

- New Pipe primitive in Shape Generator.

- New Sprite primitive in Shape Generator.

- New Cone primitive in Shape Generator.

- Improved Runtime Example scene demonstrating face highlighting.

- New "Default Material" user preference.

- New "Select Faces with Material" tool.

- New API example scene showing object and primitive instantiation

- New GUI buttons for 'Flip Normals', 'Mirror Object', 'Set Pivot', 'Vertex Color Interface' and 'Extrude Face'.

- Add ability to select vertex by clicking on it.

- Add preference for turning off sceneview notifications (Preferences/ProBuilder).

- New preference item allows you to specify the 'Force Convex' field of a 'Mesh Collider' if it is set to default collider.

- New 'Reset Projection Axis UV' repair tool. Resets all UV settings to use the 'Auto' face projection.

- New 'Force Pivot to Vertex' and 'Force Pivot to Grid' preferences allow for easier grid snapping.

- New default material for ProBuilder objects.

## Bug Fixes

- Fix system beep on Mac OS when using keyboard shortcuts (this could be a headling feature).

- Fix bug where detaching or deleting a face wouldn't always reset the \_uniqueIndices array, causing bugs in the handle selection code.

- Add undo functionality to DetachFace action.

- Fix bug where vertex color information would be lost on duplication, refresh, build, or just about any other action you can imagine.

- Fix bug where detaching a face could result in empty entries to the pb\_Object->\_sharedIndices member, throwing null-ref.

- Fix InvertFaceSelection not correctly updating the pb\_Object->SelectedTriangles list.

- Don't show 'Nodraw Face' notification if in Top Level editing mode.

- 'G' key now exits Texture Mode.

- Texture window shortcuts now show notifications.

- Fix button sizing in pb\_Editor window.

- Show notification when toggling Selection Mode from GUI button.

- Fix error in 'Detach Face' where occasionally a null shared index array would survive the rebuild.

- Fix compile errors in Editor code when exporting to Web.

- Fix bug where notification for Selection Mode handle would be incorrect.

- Fix bug where deleting a face, then undoing so would result in a NullReferenceError

- Fix bug where 'Fix GameObject Flags' would improperly exit on failing to find a pb\_Entity component.

- Fix vertex selection mouse icon drawing when not in Vertex Editing mode.

- Fix vertex color interface losing user preferences across Unity launches.

- Fix issue where pb\_Upgrade\_Utility would break installation on failing to run.

- Fix bug where rotated UVs would not move in the proper direction when dragging with texture move tool.

- Enable z-testing for face selection graphic.

- Don't show notification post-installation of Static Flag fixes if no fixes were performed.

- Fix bug where texture handles sometimes wouldn't match the selected face's transform.

- Refactor shortcut code to differentiate between modal specific actions. Fixes bug where entity assignments would incorrectly be applied in Geometry level and not Top level.

- Fix incorrect skin colors in Unity Free on 4.3.

- Fix bug introduced in 2.1.4 that broke texture handle toggling (thanks, H. David).

- Fix bug where UV rotate tool would be incorrectly calculated on selection change.

- Change UV scale and rotation behavior to no longer operate in world coordinates.

- Fix bug where extruding would occasionally corrupt the pb\_Object.uniqueIndices cache, resulting in 'NullRefError' in pb\_Object::GetVertices.

- Adjust minSize of pb\_Editor window to completely encompass buttons.

- Re-word toggle select mode and edit level notifications and make them consistent between the different access points.

- Fix bug where 'Axis Constraints' toggle in ProGrids would not be respected when translating faces.

- Fix bug where UV and Smoothing group changes would not immediately revert on Undo operations.

- Fix regression that broke Ctrl-Left click to copy UV settings to face.

- Fix bug where ProBuilder Editor skin settings would "leak" to other Editor windows.

- Fix bug where collisions would sometimes not respect user preference when creating new geometry.

- Fix bug where SceneView would sometimes not refresh on an Undo event.

- Fix bug where pressing 'W' key in the SceneView Fly mode would lock the camera to forward movement.

## Changes

- In pb\_Entity, switch the 'Sphere Collider' option for 'Remove Collider'.

- Change verbage in Geometry shortcut description.

- Add tooltip for selection mode toggle button.

- Show HandleAlignment text when using shortcut to modify.

- Move DetachFace to Edit menu.

- StaticBatchingFlags.BatchingStatic is now set by default on Occluder and Detail entity objects, and toggled appropriately when NoDraw is detected.

- Move "Create ProBuilder Cube" to "GameObject->Create Other" menu

- Re-organize ProBuilder menu.

- New "Fix GameObject Flags" utility to address static batching issues. Users experiencing issues with missing ProBuilder objects at compile time should run this command once (per scene).

- Remove 'Faces' menu item, merge with 'Geometry'

- Move 'Mirror Tool' and 'Vertex Color Interface' to Editor Core.

- Repair scripts now live in their own folder.

- Tool scripts (any Action with an interface) now live in their own folder.

- Remove unused beta upgrade script from Install folder.

- Drag selecting faces now (optional; defaults to true) limits face searching to selected objects.

- Remove 'Seamless' mode.

## API / Internal

- Add get/set for pb\_Obect->\_sharedIndices.

- Use ProBuilder.Actions namespace for all non-window requiring functions.

- When initializing a pb\_Object with a pb\_Object, use the vertex cache instead of accessing the mesh.

- Remove per-vertex smoothing methods in pb\_Object.

- Remove \_smoothIndices member from pb\_Object.

- Move pb\_Profiler to ClassesCore, allowing usage at runtime.

- Add 'color' property to pb\_Face. Used when setting Mesh.colors32.

- New pb\_Edge class (not currently in use).

- New ProBuilder.Instantiate(GameObject go) method. Behaves exactly like UnityEngine.GameObject.Instantiate() and may be used with ProBuilder and non-ProBuilder objects.

- Move math methods from pbUtil to pb\_Math.

- Added List<> overrides to many of the more commonly used pb\_Object method calls.

- Clean up face selection graphic rendering code (small editor performance improvement).

- New FixDegenerateTriangles method (handy when merging vertices or faces).

- CombineObjects method re-built for faster combine operations.

- New ProBuilder2.Common, ProBuilder2.MeshOperations, and ProBuilder2.Math namespaces. Partially integrated.

- New pb\_Editor\_Enum class and namespace.

## Known issues

- With Unity 4.3 and up, undoing a Collapse Vertices operation is slow.

- Merging rotated objects does not account for UV rotation.

- OBJ export, something broken, etc.

- Unity inserts an additional Undo when selecting a new face on an already selected object.

- Can't shift-click to deselect edges.

# ProBuilder 2.1.4

## Features

- Notifications are now displayed when a shortcut is recognized.

- New preview feature in Geometry Interface. Interactively create and place shapes.

- Remove dependency on concave MeshCollider for face selection.

- New MenuItems for opening the Texture Window, and assorted editor commands.

## Changes

- Move GUI folder to Resources, allowing 6by7 root folder to be placed anywhere in Project hierarchy.

- Decouple collisions from ProBuilder API entirely.

## Bug Fixes

- Fix bug where Mesh.Colors32 property would be lost on duplication.

- Clamp values in Geometry Interface to sane values.

- Fix plane generation pivot location when segments < 0.

- Fix bug that caused Unity to no longer recognize numberical input.

- Fix regression in 2.1.3 that caused MeshColliders break on entering playmode.

- Fix bug where shortcut keys would sometimes not be recognized.

- When updating ProBuilder, the editor window is now force-reloaded.

- Editor window is now sized correctly for both dockable and non-dockable frames.

- Fix compile errors when building project in Unity 4.1.2+

- Fix bug that caused merged objects to incorrectly snap vertex points while ProGrids window is present.

- Fix NullReferenceError when clicking Merge button with nothing selected.

- Fix GUISkin issues in Unity 3.5.

- Fix GUISkin modifications affecting pb\_Geometry\_Editor incorrectly.

- Fix 'Delete Face' notification incorrectly displaying on OSX.

- Fix merged objects losing collisions.

## API

- ProBuilder.Shortcut is now pb\_Shortcut.

- Add pb\_Upgrade\_Utility as a base class for all updating operations.

# ProBuilder 2.1.3

## Features

- New Vertex Color Interface.

- New 'Detach Face' action.

- New 'Toggle Mover Visibility' button.

## Changes

- pb\_Mesh\_Extension renamed to pb\_Object\_Extensions.

- Transition default shader to Diffuse Vertex Color.

## Bug Fixes

- Fix pb\_Object breakage when upgrading to 2.1.2+ from <= 2.1.1.

- Fix bug where switching to Geometry mode would not always correctly set Tool.current to Tools.None.

- Fix bug where calling the distinctIndices member of a pb\_Face would sometimes throw an exception.

- Fix null reference errors when deleting object faces.

- Fix regression in 2.1.2 that caused non-cube type primitives to lose entity data and mesh information.

- Fix regression that caused Nodraw Visiblity Toggle to break.

## API

- Remove unnecessary calls to the mesh reference when accessing vertex information (most notably in UV mapping functions).

- Cache distinct indices in pb\_Face, replacing pb\_Face::DistinctIndices() with pb\_Face.distinctIndices.

- Add pb\_Edge class, and accompanying methods to retrieve all face edges and selectively perimeter edges.

- Add SetColors32(Color32[] colors) to pb\_Object class.

- Add DetachFace(pb\_Face face) to pb\_Object class.

## Internal

- Update to SVN 1.7, small adjustments to build scripts.

- Add shell script to build distributable packages on OSX.

# ProBuilder 2.1.2

## Features

- New interface for pb\_Entity class in Inspector.

- Scale transform now supported.

- Double click pb\_Object face to select all faces.

- New ProBuilder/About window provides more build information.

- Full prefab support (removes "Create Prefab" button from ProBuilder editor).

## Changes

- Rewrite context tip for Lightmapping button to reflect it's new purpose.

- Automatically freeze scale transform when applying any change to vertices.

- Always ZTest for selection graphic in face mode.

- 'G' key now toggles between Edit Levels.

- Remove face vertex handle information from scene view.

- Remove install script from package.

## Bug Fixes

- Fix bug where user would be allowed to add multiple collision components to pb\_Object.

- Fix bug where geometry would shift on Undo/Redo incorrectly.

- Fix leak when deleting pb\_Objects.

- Fix regression in 2.1.1 that introduced a leak on switching pb\_Objects while in ModeBased vertex editing.

- Fix bug where selection graphics would occasionally not update on undo, redo, or prefab apply / revert.

- Fix bug where setting EntityType would destroy transform parent/child connections.

- Fix incorrecty window sizing in pb\_Editor.

- Fix rare error log when duplicating prefab objects.

## API

- Add OnVertexMovementFinished event to pb\_Editor.

## Internal

- Implement SixBySeven shared library.

# ProBuilder 2.1.1

## Features

- Add MirrorTool action.

- Add Prism primitive.

- Add ProBuilderizer action (API example).

- Add Flip Winding Order action (flips face normals).

- Add dimensions parameter to Prism and Cube in Geometry Interface.

- Add ability to delete faces (select faces and press backspace)

## Changes

- "Auto NoDraw" becomes "NoDraw Tool", and features a vastly improved interface.

- Scroll bars added to ProBuilder Preferences panel, allowing for unlimited preference additions.

- Add undo support to Set Pivot action.

- No longer force rename pb\_Objects post-initialization.

- Comment out menu item for Project Wide Nodraw utility, leaving action available for advanced users.

## Bug Fixes

- Fix bug where handles in Seamless editing mode would not draw.

- Fix bug where selected objects would disappear at runtime.

- Fix bug where drag selection would not be recognized in Seamless editing mode.

- Fix Unity crash when importing packages while ProBuilder window is open.

- Fix regression in 2.1 where a MeshCollider would always be assigned to pb\_Object, regardless of Collider settings.

- Fix cylinder generation code to properly account for height divisions (now accepts 0 as a parameter).

- Fix bug where undoing texture modifications would not consistently refresh pb\_Object to original state.

- Fix bug where pb\_Objects would disappear at runtime with static batching enabled.

- Add overload to TranslateVertices that accepts bool forceDisableSnap.

- Fix bug in PivotTool that caused vertices to incorrectly be snapped when setting new pivot with snapping enabled.

## API Changes

- Add pb\_Object::InitWithObject

- Add ProBuilder::CreateObjectWithObject

- Add pb\_Object::GetName

- Add ProBuilder::CreatePrimitive(ProBuilder.Shape shape)

## Internal

- Add DrawAllFaceNormals to #DEBUG flagged pb\_Editor.

- Update Sublime Extension to version 3.

# ProBuilder 2.1

## Features

- Add Smoothing Group support.

- New face selection graphic system respects depth order + speed boost.

- Add drag selection support for faces.

- UV2 channel generation now totally automated.

- New Lightmap Window exposes UnwrapParam properties per-object for fine-grained UV2 generation control.

- Add smart object naming, with the convention "pb(Shape Type)([Entity Type])-(Object ID)" - ex: pb-Cube[Detail]-1701)

- Add new "Mover" entity type, which is non-static and allows complete control at runtime.

- Add support for n-gon faces.

## Changes

- 'World' is now default handle alignment.

- Update default materials with dedicated textures.

- Update QuickStart window with more explicit options.

- Default values for Cylinder are now slightly more sane.

## Bug Fixes

- Fix ProceduralMaterials throwing errors in Texture Editor.

- Fix rare bug where incorrect vertex indices would be selected in an UpdateSelection() call, throwing a NullReferenceException.

- Fix bug where toggling selected faces would not correctly remove vertices from internal selection list.

- Fix bug where pivot would center at 0,0,0 on merging objects.

- Hide ACG property in Inspector window.

- Fix bug where merged objects would lose EntityType information.

- Fix bug where prefab creation would not account for pb\_Group data.

- Fix bug where merged objects would lose normal data.

- Fix bug where exiting Texture Mode would not consistently set Edit Mode to Top.

- Fix bug where generating UV2 channel would incorrectly hide NoDraw faces, breaking synchronization with pb\_Editor UI.

- Fix bug where ListenForTopLevelMovement would incorrectly fire, significantly slowing scene navigation.

- Fix bug where duplicating multiple objects would result in referenced pb\_Objects.

- Fix bug in pb\_Group where SetActive would incorrectly be called in Unity 3.5.

- Fix bug where collision meshes would not correctly update after an Undo / Redo event.

- Fix bug where drag selection would not exit properly if a function key is pressed mid drag.

- Fix bug where vertex handles would incorrectly be drawn in Top level editing mode.

- Fix bug where deleting a pb\_Object would occasionally cause a NullReferenceError in UpdateSelection().

- Fix bug where Occluder objects would not allow textures to be applied.

- Fix bug where box colliders would not properly inherit trigger boolean value.

- Fix bug where merging objects or creating groups would not snap pivot point to grid (this also introduces centered pivot points).

- Fix rare bug where get\_localRotation would fail.

- Fix white flash in Texture Window preview.

- Fix bug where ProBuilder would not remember Handle Alignment setting.

- Fix bug where editor selection property would not correctly update on object deletion.

- Fix minor bug where vertex handles would sometimes not immediately draw on entering Geometry editing mode.

- Fix bug where closing Texture Window manually would not always exit EditLevel.Texture.

- Fix bug where an Undo/Redo event would sometimes cause pb\_Editor to attempt to refresh every pb\_Object in scene.

- Fix bug where exiting EditLevel.Texture to Geo Mode would not correctly remember the previous SelectionMode.

- Fix bug where cylinder object sometimes initialize with un-even side lengths.

- Fix bug where on deleting a pb\_Object's MeshCollider, ProBuilder would not immediately re-initialize it (prevents common PEBKAC error).

## API

- Integrate Doxygen (Still a work in progress - feel free to drop by the forums with any questions).

- Add SharedTrianglesWithFacesExclusive for extracting shared triangle indices exclusive to passed faces.

- VerticesWithIndiceArray is now VerticesWithTriangleArray.

- Remove pb\_Object::CreatePrimitive. Use pb\_Shape for object creation, or pb\_Object::CreateCube(float scale).

- Add OnVertexMovement EventHandler to pb\_Object.

- pb\_Object::CreateObjectWithPointsfaces is now pb\_Object::CreateObjectWithVerticesFaces.

## Actions

- Update AutoNodraw to cast from all vertices + center point when determining hidden flag.

- In PivotTool.cs, snap pivot point to grid if no vertices are selected.

- Refactor EntityType.Brush to EntityType.Detail.

## Internal

- Add pb\_Profiler class

- Add UVee window + ProBuilder specific modifications

- Add internal preference to force update preference when necessary (usually means adding shortcut items).

- Significant performace improvements in handle drawing.