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## Conference Proceedings

Rachel S. Smith, Editor

### **Why Walk When You Can Fly?**

**Reflections from an Advanced Second Life®  
Preconference session**

*Christopher Holden and Beth Sachtjen | NMC Virtual Worlds*

# Why Walk When You Can Fly?

## Reflections from an Advanced Second Life® Preconference session

*Christopher Holden and Beth Sachtjen | NMC Virtual Worlds*

This session was planned to give those who have mastered the basics of Second Life (SL) some of the tools and perspective required to move on to the next level of content creation. What makes SL unique is the fact that these tools are easily accessible to people outside the field of computer graphics and programming, allowing other professionals such as educators to use them and develop new and specialized uses for the platform.

Content creation in SL covers a wide range of disciplines, including animation, clothing design, film making, scripting (simple programming) and more, though the most successful projects and ideas often combine some or all of them to create a complete, immersive and interactive experience for the end user.

At the 2008 NMC Summer Conference, this session covered techniques for “building” in Second Life as an almost entirely in-world process. While we did discuss the use of third party software outside of SL, such as Poser for the creation of custom avatar animations, and Photoshop for the creation of custom textures and clothing, we chose to focus our scope to creating content entirely within Second Life. In an effort to further hone our focus, we also provided textures for participants to use in the class projects. These served as examples of Second Life’s treatment of textures and images, without complicating the process by including instructions on the various paint or image editing packages our participants might choose to use beyond the session.

### **Anyway... what is “advanced” SL building? Actually it’s ALL “simple”!**

Compared with other 3D modeling software and indeed virtual reality development platforms, creating in SL is very simple. The difficulty often comes not in learning all of its features, but figuring out how to create sophisticated, professional results with such a limited toolset. In the first section, we took a look again at the basic toolset participants might have learned as newbies (newcomers to Second Life), but with an eye to its accurate and efficient use as the first and most important step to getting more professional results from their hard work in SL.

We pointed out that the first mistake often made by newbies, having learned how to rez (create) a prim (basic building block) and start building, is to over-do things; such as using huge textures (anything over 512 by 512 pixels), applied to hundreds of misaligned prims, built without any planning or sense of what it should look like. Because of this common mistake, we stressed the importance of planning what you intend to build by design or sketch before you even set prim to ground, so to speak.

We defined the most crucial starting point in planning as observation. For instance, if one is replicating a real world object, such as a house or building, it is critical that one observes its fundamental characteristics – as an architect, Christopher is particularly aware of how simple things like the proportions of a window’s height and width can make the difference between something that looks convincing and something that looks like an infant’s first attempt to draw a house! These kinds of observations are always taught to artists practicing the more traditional forms of representation, but creating content in SL is not so far removed. However advanced or realistic the technology becomes, we are often simply creating representations of the real in our virtual world and the artistic interpretation we apply to them might be as valid as that of an impressionistic painting.

## Re-evaluating the “simple” tools

### Defining camera, wand, grid, basic textures, and more

By first pointing out a few of Second Life’s tools for interacting within the virtual world, we were able to more quickly allow participants to “break free” from the confines of their avatars and to see Second Life as a program in which object editing occurs on top of the instantly discernable social atmosphere. Below are some of the key terms and functions we helped participants to discover.

**Camera.** Leaving your avatar in one place and using the camera to move around your build turns “building” into “modeling.” Participants were able to recognize how this makes editing easier, as it gave them an overview and access to every face, corner and aspect of their surroundings with ease. Even working on a whole sim, the scale becomes manageable. Participants who had modeled in other programs were more able to relate to building in Second Life with a model-centric view rather than the avatar-centric view that SL typically presents to the beginner.

**ALT-ZOOM.** Hold the ALT key down and use the mouse to left-click on a subject of interest. Keep the ALT key and mouse button down and move the mouse, side to side and back and forth. By encouraging participants to practice clicking from object to object, or from one side of an object to another, we were able to show them how to navigate an entire sim in this manner of walking with the camera while their avatars remained in one place.

**Level Of Detail (LOD).** Smaller or more distant prims will be culled (not displayed) by the SL client depending on your draw distance (set in preferences).

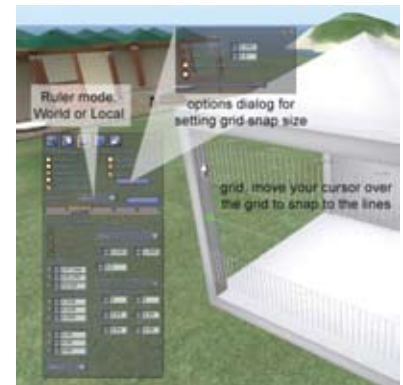
**CTRL-ALT-D.** This key combination enables the Advanced menu. From here, select “disable camera constraints” to roam further. Other useful options we outlined here included the Sun Override: **World > Sim Sun Override.** This stops the sun from setting so you don’t have to build in the dark!

**The Grid or Ruler mode.** This is used to *snap* the prim to known numbers when moving or stretching. Moving the cursor out and over the grid lines while dragging or stretching a prim snaps that prim to the “grid.”

- The World grid is relative to the sim for position and uses real world units: meters. Use the “Options” button for the world grid to change the size of the grid snap in meters.
- The Local grid is relative to the selected prim, both for units and direction. Units for the local grid are multiples of the prim’s own dimensions.

**SHIFT-dragging.** Holding the shift key down while you drag a selected prim or object will duplicate it. Try SHIFT-dragging a single prim cube, but use the grid when you do. Try it with both the world grid first and then the local grid. Participants found that they could create perfectly aligned or spaced prims in this manner. You should be familiar with the numbers in the edit box for resizing and positioning prims, as they are unavoidable and quick for many things, but using these techniques you can often build without them entirely and still end up with perfectly aligned builds.

**The Wand.** This tool is used for rezzing prims. The wand also has another mode not widely known but does give it its “magic.” Check “Copy Selection” and “Center Selection.” The wand will now duplicate the selected prim or group, perfectly aligned with the face of whatever prim or group you click the wand against. If you’re using this function a lot, also check “Keep tool selected.” Note the behavior with respect to the root prim of the object being duplicated as it can be unpredictable.



Simple Textures: Builder’s Texture, Wood, and Concrete

**Simple Textures.** These are general purpose square textures (see samples: “Builder’s Texture,” “Wood,” “Stone,” “Concrete,” “Shadow,” and “Invisible”). All are small, 128- or 256-pixel square textures. Simple Textures are typically darkened at the edges to exaggerate the form and lines of the prim and are used to represent most of the basic materials. They are intended to be used with a repeat of just one (not tiled).

We explained to participants that you can do an entire build with textures like these. They are simple to create in Photoshop, using tools like noise, blur, and difference clouds. Builder's Textures were used in place of the default plywood to define edges and clarify the build initially. We also talked about two other types of simple textures: Invisible and Shadow textures. Invisible textures, which are completely transparent, are used because it is impossible to set 100% transparency with the edit menu. Shadow textures, on the other hand, are placed under objects to add depth and realism, replicating a shadow at a set time of day.

**Proportional Textures.** These are, once again, used at a repeat of one, but created specifically for and of the same proportions as a specific prim, before resizing and uploading. (See "Post" example, pictured.) This technique of creating correctly proportioned textures will be used again later.

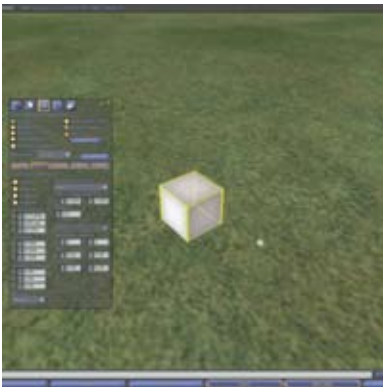
### The Do's and Don'ts of Texturing

- **Don't** expect photo-realistic textures to equal photo-realistic results.
- **Don't** tile small samples of a material such as brickwork over prims.
- **Don't** use textures larger than 512.
- **Don't** use several textures with alpha (transparency) in close proximity to each other.
- **Do** use binary multiples for texture sizes, typically 64, 128, 256, 512.
- **Do** use small, simple textures with a repeat of one where you can.

### Building Task

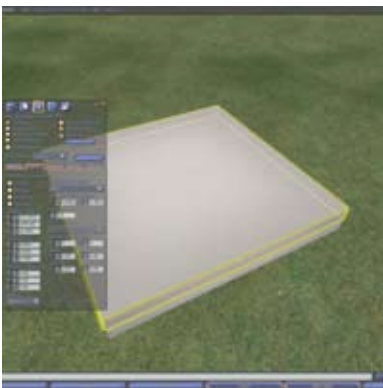
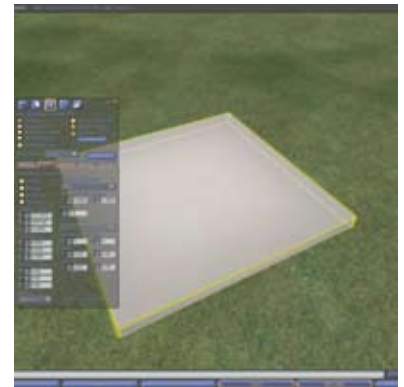
A low prim building module using all the above techniques was used to demonstrate a sophisticated result using simple tools. We asked participants to follow along with these instructions, creating their own structures and asking questions when appropriate.

Post Texture



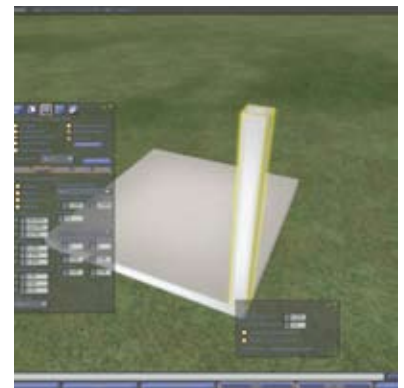
◀ Rez a single prim cube & texture it with the "Builder's Texture."

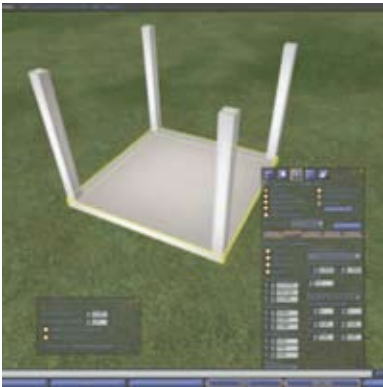
▶ Re-size it using the numbers in the edit box to 8m x 8m x 0.5m



◀ Making sure the prim is still selected, click the magic wand tool on the palette, check Copy Selection and use the magic wand to click on the top face of your first prim.

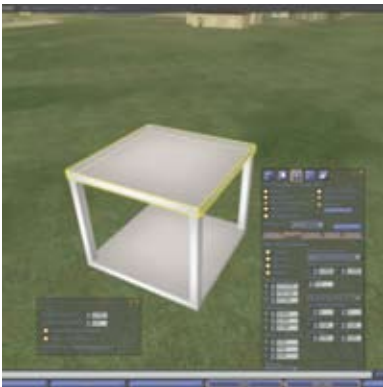
▶ Select the newly rezzed prim which should be a copy of your first and make sure the Ruler Mode is set to World. Set the grid Options to 0.5m and stretch the prim into one corner until it is a post, 0.5m x 0.5m on the sides and 6m tall.





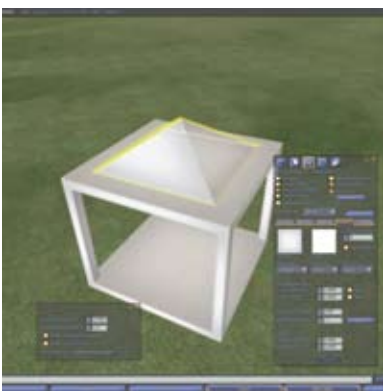
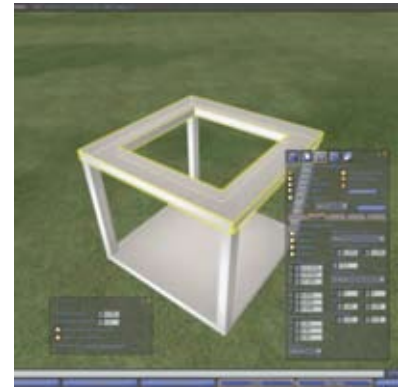
◀ Either repeat this process until you have 4 posts, one in each corner; or set the Ruler Mode to Local and shift-drag your post into the remaining three corners of your base.

▶ Select just one of the posts, and using the magic wand and copy selection technique, duplicate it on top of itself.



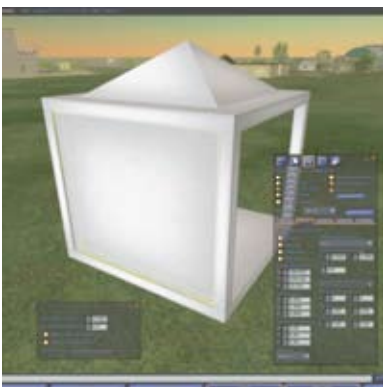
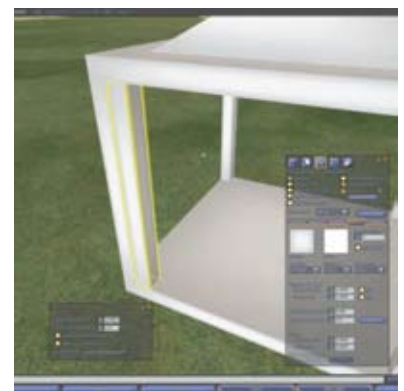
◀ Using the World grid, stretch the newly rezzed post into a roof that exactly fits the columns, 8m x 8m x 0.5m high.

▶ Set the Hollow of your roof to 70 to create an opening for the skylight.



◀ Use the magic wand again to duplicate the roof on top of itself. Resize it using the numbers this time to 6m x 6m, then set the taper to X=1 and Y=1. Stretch it upwards using the world grid so it becomes a 2m tall pyramid.

▶ The last step is to create a single wall between 2 posts. To do this, select a post and use the magic wand to duplicate it next to itself.



◀ Stretch the new post using the grid so it exactly meets the opposite post. Make it a bit thinner than the posts by editing the numbers in the edit box: change 0.5m to 0.3m.

◀ You're done building! Using the textures given to you, texture it as follows:

- Apply the "post" texture to each of the posts.
- Apply the "concrete" texture to the whole base, then texture its upper face with the "wood floor."
- Apply the "interior wall" texture to the inner face of the wall.
- Apply the "exterior wall" texture to the outer face of the wall.
- Apply the "asphalt" texture to the top face of the roof.
- Apply the "wood" texture to the edges of the roof. Set the transparency of the rooflight to 50% and adjust its color to a blue/green.

Linking: Lastly you will link the prims used to create the building module. In edit mode start by selecting any prim but the base; we will select this one last of all. Holding the SHIFT key down, click on the other prims of your building. You will see that this adds them, or by clicking again, removes them, from your selection set. Select them all, finishing with the base prim, and then use the **Tools menu > link** to group them together.

Your building is now a single object that can be taken in to your inventory, rezzed, moved and duplicated.

The “Edit linked parts” checkbox is used for unlinking or editing single prims in a link set. Check “Edit linked parts” in your edit dialog box and try stretching your wall into a half-wall. Unlink a single post by using “Edit linked parts,” and use it create a second wall at 90 degrees to the first in your building module using the techniques above. Don’t forget to relink the post and your new wall to the module when you’re done.

## **In Review**

In general, the participants were able to pack up their finished or nearly finished structures at this point. We covered a lot of techniques with this project and were pleased to see that many of the participants who came in to the session claiming to not know how to build were not only able to complete the instructed building project, but more importantly also had a demonstrable knowledge of the same tools that professional builders use in Second Life everyday. Armed with a new understanding of Second Life’s editing functions, participants will be able to go forth and apply their own style of design and personal observation to future projects that they might take on.

This demonstrative approach to learning about the Edit menu provided session attendees with a way of learning by doing that is compatible with the explorative nature of the virtual world experience.

## **Passing the Torch**

To round out our session we briefly covered many other Second Life options that pertain to building and developing either directly or indirectly. Over the past two years of the NMC Virtual Worlds project, we’ve learned quite a bit about how land settings can impact your ability to share or transfer what you have done to another person or group. Many of our participants were faculty members who would potentially do the same, so we felt it important to cover a few important issues. Similarly, there are quite a few content-related issues that come up for nearly every land owner or builder at some point, and we wanted to pass on our experience.

### ***Land-related Techniques***

Many of our participants already owned or rented land, and most planned on doing so at some point, so we found it appropriate to also cover some very basic land management techniques as they pertain to building and development.

Participants were shown how they could access land options from two places:

- **The About Land dialog:** click the land name in the menu bar at the top of the screen, or right click the ground and select “About Land.”
- **The Region/Estate menu:** under the World menu at the top of the screen.

We also discussed the two types of ownership on private islands:

- **The Estate Owner** essentially bought the island, pays the island fees to Linden labs and has absolute control of it.
- **The Secondary Land Owner** (our term), buys land set for sale by right clicking the ground and selecting “buy/sell.” This may also be a group rather than an individual, set by “deeding” the land to group in the “About Land” dialog.

Understanding how land ownership works in Second Life is important to a builder because the settings of the parcel of land they use can affect the types of content that can be developed, interacted with, and transferred. At this point, we also addressed some common questions that impact the relationship between building and land ownership.

- **Private vs. Mainland:** In regards to private islands, land may be sold to give another person or group permissions to use and change the land for their own use, such as enabling them to set the parcel media stream, set auto return, allow building etc. The Estate owner still retains absolute control and the responsibility of paying Linden Lab. However, on the Mainland the buyer is responsible for paying tier to Linden Labs. You can consider that Linden Lab is effectively the Estate owner in this case.

- **Prim allowances:** Prim allowances are per plot and are cumulative for plots of the SAME owner in the SAME sim, so in a heavily built-up campus sim for example, be very careful about parceling off a small plot and selling it to another person. If there are too many primms on that plot they will be auto returned without warning!

## Media

Adding media, sound, movies, and web content is done by putting references in the Media tab of the “About Land” dialog. Islands may be subdivided or “parceled” to allow different media streams in different locations.

To play movies, use either a Freeview or other media screen; or simply make a unique texture to place on a single-prim screen by going into the “About Land” dialog, Media tab, “Replace texture.” This also applies to web content.

## Terrain

You must either own the land, be in the group the land is deeded to, or the Edit Terrain checkbox must be ticked in the Options tab of the “About Land” dialog in order to edit any terrain in Second Life. Landscaping can be done in many different ways, but there are three different scales on which the terraforming takes place.

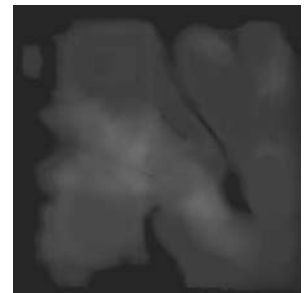
- Small scale: select the tool and size, edit the terrain by hand;
- Medium scale: select land and tool, use the “Apply” button;
- Sim scale: use RAW terrain files.

## RAW File Editing

At the time of this writing, only the Estate Owner is able to download or edit a RAW file, but using this process is a powerful way to customize a sim’s landscape on an overall scale. To edit a region’s RAW file you will need to first locate the functions in the Region/Estate menu, under the Terrain tab.

When editing a terrain file, we suggest the following steps:

- Download the existing terrain as a backup and example.
- Open & save in Photoshop with the following options: 256x256, 13 channels, 8 bit Interleaved.
- A terrain file is basically just a grayscale image ranging from black to white in 256 increments representing height from low to high. This can be made any way you like, but to save it as a RAW file this image must be pasted into the RED channel of a 13-channel Photoshop file and saved in the above format. The BLUE channel gives sea level height; the green channel is a height multiplier. The easiest thing is to use the file you downloaded as a starting point.



Island terrain image, illustrated in grayscale

To generate terrain besides painting by hand, you might try software such as Terragen, a general purpose terrain generator for the PC (see <http://www.planetside.co.uk/terrigen/>), or Backhoe, specifically created for Second Life and available on the Macintosh platform (see <http://www.notabene-sl.com/Backhoe/>).

## Beyond Shape

While terrain and RAW file editing are two of the more common terraform-related questions, we also went on to illustrate some important points on landscaping and creating climate in Second Life. For example, landscaping may be essentially trees, plant, and water, but don’t forget “furniture” such as benches, street lights, bollards and paving all help to create atmosphere and realism.

As far as trees and plants themselves go, we urged participants not to overlook the Linden-created plants in their libraries. These are detailed, take only a single prim each, and many of them move with the wind. Used with discrimination these are a great way to populate an outside space using low prim overhead while keeping to the general SL aesthetic.

At the same time, there are many 3rd party plants to buy in SL, but bear in mind, most use alpha (transparency) and if badly done exhibit fringing around the edges, commonly referred to in SL as a “halo.” Additionally, alpha ordering will always be an issue with overlapping plants and over-use can also produce garish results & clashing colour palettes.

## Introduction to Other “Advanced” Techniques and Terms

While we did cover several topics that were new to participants throughout the session, we wanted to briefly define some new approaches to content creation and related terms in order to plant the seeds of further learning outside of our session. Below is a list of some of the terms we touched on and their definitions:

**Advanced texturing**, such as mapping using scaling and offsets over multiple prims. More complex objects such as building facades with doors and windows require multiple prims and clearly the simple textures used above won't work. You could use a small sample of material such as brickwork and tile it over all the prims, but as already suggested this leads to poor results, repetition becomes apparent and realistic shading is impossible, so we use a different combination of techniques derived from those of the simple textures.

**Scale.** The texture scale for each prim equals the prim dimension divided by overall dimension in each direction. (Texture scale = prim dimension / overall dimension)

**Offset.** The offset for each prim equals the scale divided by two, plus or minus 0.5 for the edge prims (left and right). For subsequent prims, add or subtract the texture scales of adjacent prims between it and the edge, from the above value. (Edge prim offset = (scale / 2) + or - 0.5)

**Scripting.** In short, Linden Scripting Language (LSL) is an event-driven, state-based programming language.

**Sculpties.** Sculpties are a special prim type, requiring a third party modeling tool outside of SL to create the shape. This saves the shape data in a bitmap image file which you upload into SL and drop into the square on the object tab of the edit dialog.

**Building Tools.** These are tools developed to make building easier. We all need a little help sometimes and SLers have developed tools using LSL to make some tasks easier. You can buy or get these for free or even script some yourself; every aspect of a prim is scriptable. Examples include Shapemakers, Rez Foo, Rez Faux, Builder Buddy, etc.

**Lighting.** Lighting requires careful use. The SL client only renders the nearest 6 lights, so over-use results in strange on/off effects. Light knows no boundaries, passes through walls, and can cause light pollution for your neighbors if not carefully planned.

## The Session in Review

While “Advanced” Second Life could be defined in many different ways, we found the session we provided to be at an appropriate level for participants who had been in Second Life for 6+ months. By gearing the session towards this specific audience, we were able to maintain an ambitious curriculum and still leave room for the many questions that participants had encountered during their time as residents. Many of the enrichment activities we had initially planned needed to be cut in order to allow for the highly specific questions that residents at this level have, which are often more oriented to Second Life's permission system, land management issues, and the technical aspect of the user interface than they are specific to content creation.

## Glossary (of terms not defined elsewhere)

**Avatar, Av, Avie** (noun): The virtual character that symbolizes your presence in Second Life.

**Build** (verb): The act of creating objects in world. Build can also be a noun, usually referring to a sim designed as a unit or a series of structures designed together.

**Inventory** (noun): The window that contains all of the items that currently belong to you.

**Newbie** (noun): A person that is new to Second Life.

**Permissions, Perms** (noun): Every object created in Second Life can also have permissions set on it by the creator. A creator can choose to sell/give an item at “full perms” meaning that it is copyable, modifiable, and transferable, or can choose not to allow certain permissions on the object.

**Prim, Primitive** (noun): A prim is a primitive shape that is the basic building block of Second Life. Prims are used alone or in conjunction with one another to represent the furniture, buildings, and nearly everything else found in Second Life.

**Resident** (noun): A person that has A Second Life avatar.

**Rez** (verb): To make an object appear in world by creating it through the build tools, pulling it from your inventory into the world, or by way of a scripted object.

**Sim, Simulator** (noun): A Second Life location in its entirety. Each sim has a unique name and “sim borders” regardless of whether it is separate or surrounded by other sims.

**SLer or SL'er** (noun): A **S**econd **L**ifer.

**Texture** (noun): A texture is an image that can be applied to any prim or object in Second Life to further the illusion of the object being a real object. Textures can also be worn on the avatar in the form of skins, clothing, etc. Texturing refers to the process of applying textures to an object, creating the textures outside of Second Life, or the visual result of textures on an object.

## About the Authors



**Christopher Holden** graduated in Architecture and worked in practice for over ten years while maintaining an interest in computer modelling, programming and multimedia. Second Life finally provided the opportunity to apply all these disciplines together and after three years juggling work in both the real and virtual worlds, Christopher crossed over entirely to a full time position with the New Media Consortium. When he is not developing buildings, environments and learning tools for the NMC, Christopher also runs a successful Second Life business and undertakes private commissions for celebrity avatars including Bill Keller, Mick Jagger, and Desmond Tutu, to name but a few.



**Beth Sachtjen** has been a developer in Second Life for the past three years, working with a variety of clients ranging from educational institutions to corporations and government organizations. Before her move to virtual development, Beth worked in corporate training and client services as well as web support. Beth has been a pioneer in using Second Life as a medium for expressive art and continually displays sculptures in numerous virtual galleries and mixed reality exhibitions. As a geek trapped in an artist's brain, she came to NMC with a sincere passion for exploring virtual worlds as a form of communicating with imagination.

## About NMC Virtual Worlds

The mission of NMC Virtual Worlds is to help learning-focused organizations explore the potential of virtual spaces in a manner that builds on community knowledge, is cost-effective, and ensures high quality. NMC Virtual Worlds provides a palette of premium custom services for education and training, and conducts an ongoing series of events, conferences, and programs. A suite of pro bono services and fellowships are a central aspect of the organization, and reflect our deep commitment to learning and access.