The Fast Sketch Model:
Building a Car Body in 2 Days or Less

David Sichtermann – Technicon Design

ID7264-P

This class will show a few tricks to greatly improve your sketch modeling workflow. In addition to a fast-paced modeling technique, you will acquire the ability to make broad-stroke changes to your model with a minimum of "delete and rebuild" downtime. All of this will greatly improve your ability to work with a designer, making changes to your model as it evolves from a 2D sketch to the final 3D representation.

Learning Objectives

At the end of this class, you will be able to:

- 2D to 3D Curves: Clean curve plots set you up for clean surfacing

- Designer's Priorities: Breaking apart a design into its core areas and building those first

- Discover how Alias software is an effective tool for car design

- History Zoning: Construction History is a good thing, until it's no longer needed

About the Speaker

David Sichtermann manages the American division of Technicon's Design Academy. Building from his experiences as a designer and digital sculpting contractor, David incorporates as many "tips and tricks" as possible as he teaches classes in Autodesk Alias, Maya and VRED.

In addition to managing and teaching classes through the Academy, David manages various on-site modeling and design projects for many of the company's OEM clients.

David has been using Autodesk products for nearly 20 years. Starting with AutoCAD and Mechanical Desktop, he quickly realized his passion for all things digitally modeled.

A graduate of Art Center College of Design, Pasadena CA, David has worked as a designer, 3D modeler, and visualization specialist both freelance and later as a contractor through Technicon Design.

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"Measure Twice / Cut Once" ...It's all in the setup!

The secret to an efficient model is the setup. Building from 2D curves made directly over orthographic sketches, a "wireframe" of 3D curves is created almost automatically. Even before building your first surface patch, the 3D curves are already showing you if you've nailed the proportion and key features of the design.
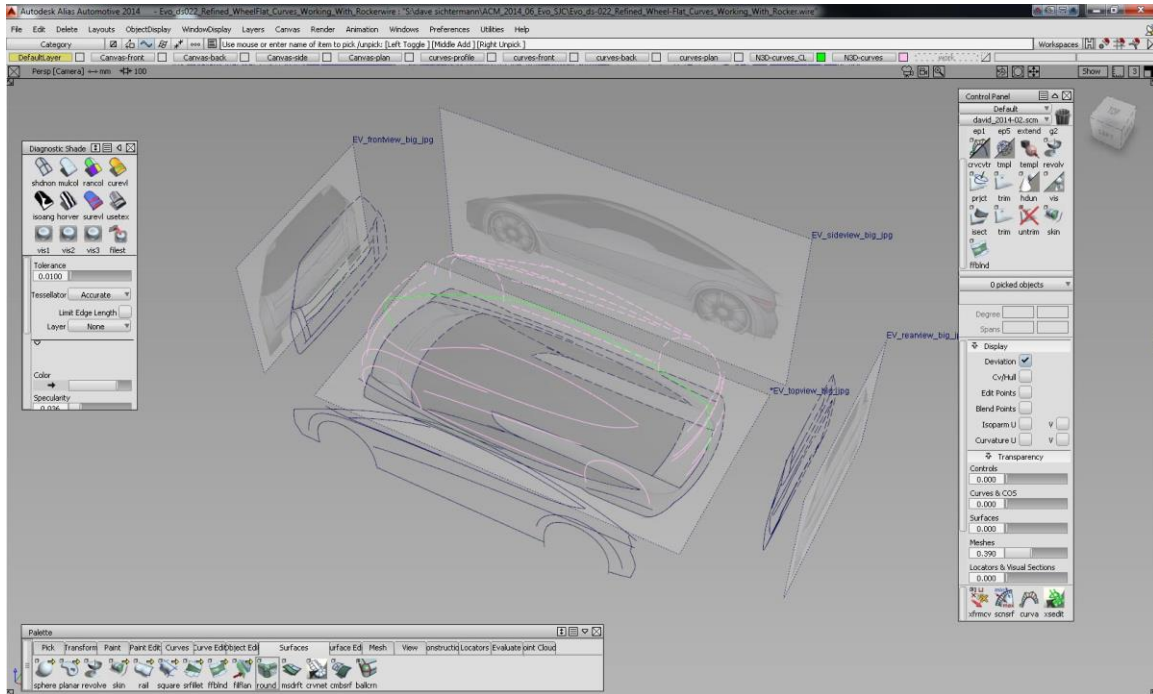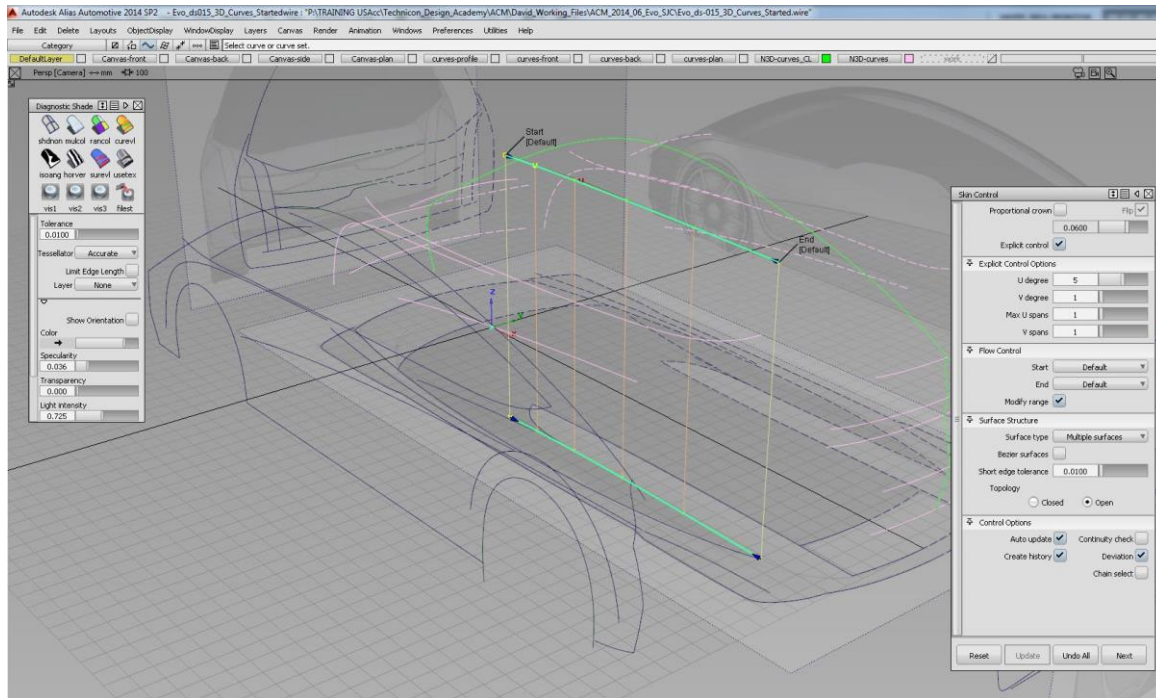

Step-1: "Low-Math" 2D Curves Built Over Imported Canvases

Starting with 2-degree Edit Point Curves, each orthographic view is "Blocked-In."
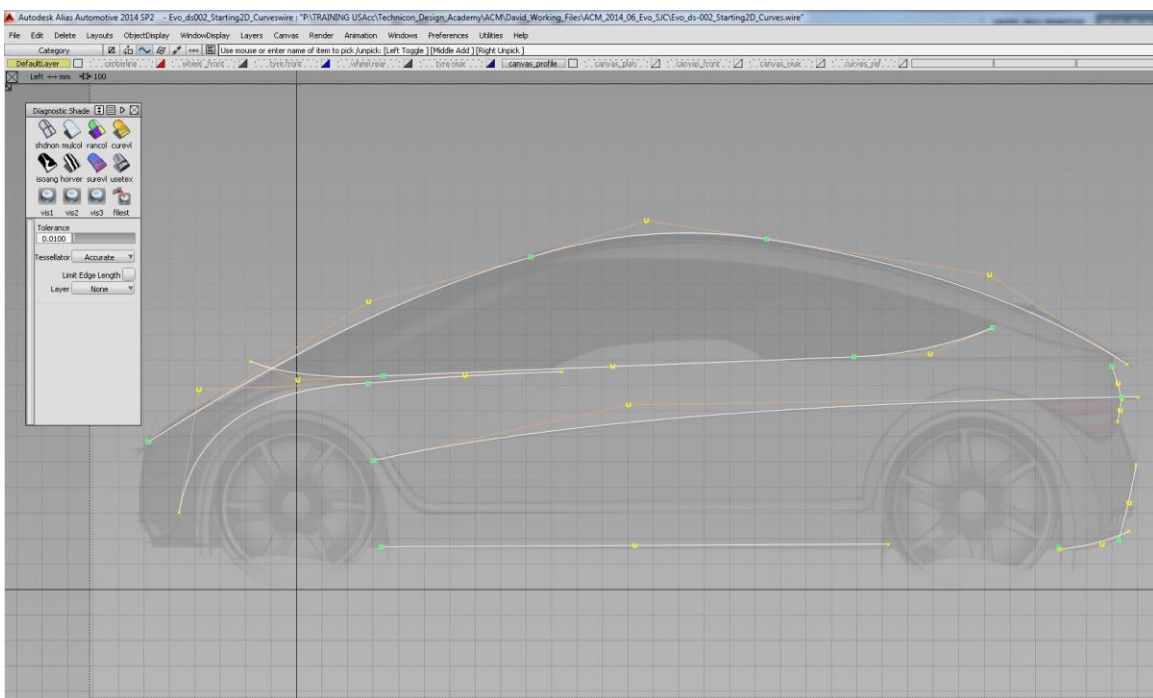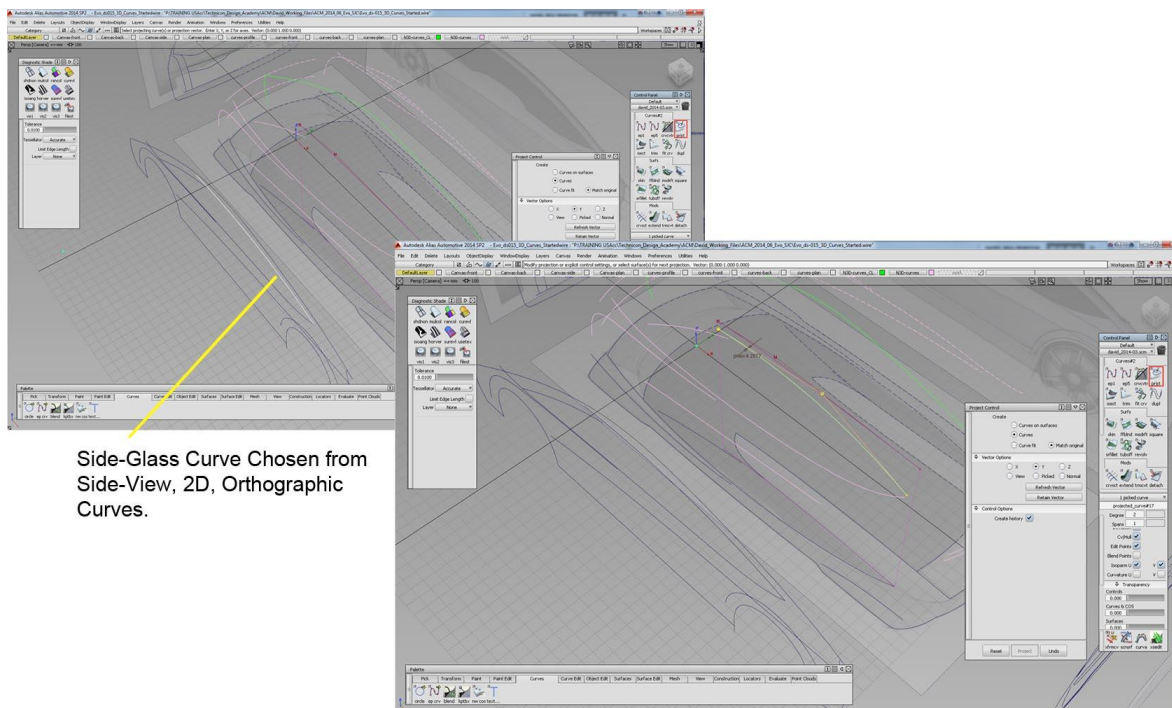
Step-2: Build "Walls" for 3D Projection

Build Skin, a Rail, or a Draft surface based on the curves from one of the orthographic views.

### Step-3: Project the 2D Curve from "The Other View" to Yield an Accurate 3D Curve

Choose "Curves" in the Project Control dialog box, and confirm the correct direction (x,y, or z).

Side-Glass Curve Chosen from Side-View, 2D, Orthographic Curves.

Step-4: Fine-Tuning the Setup for a Perfect 3D Curve

In order to preserve construction history of the 3D curve, make changes to the curve(s) used to create the "wall" used in the projection. The projected curve maintains history and the required 3D shape.
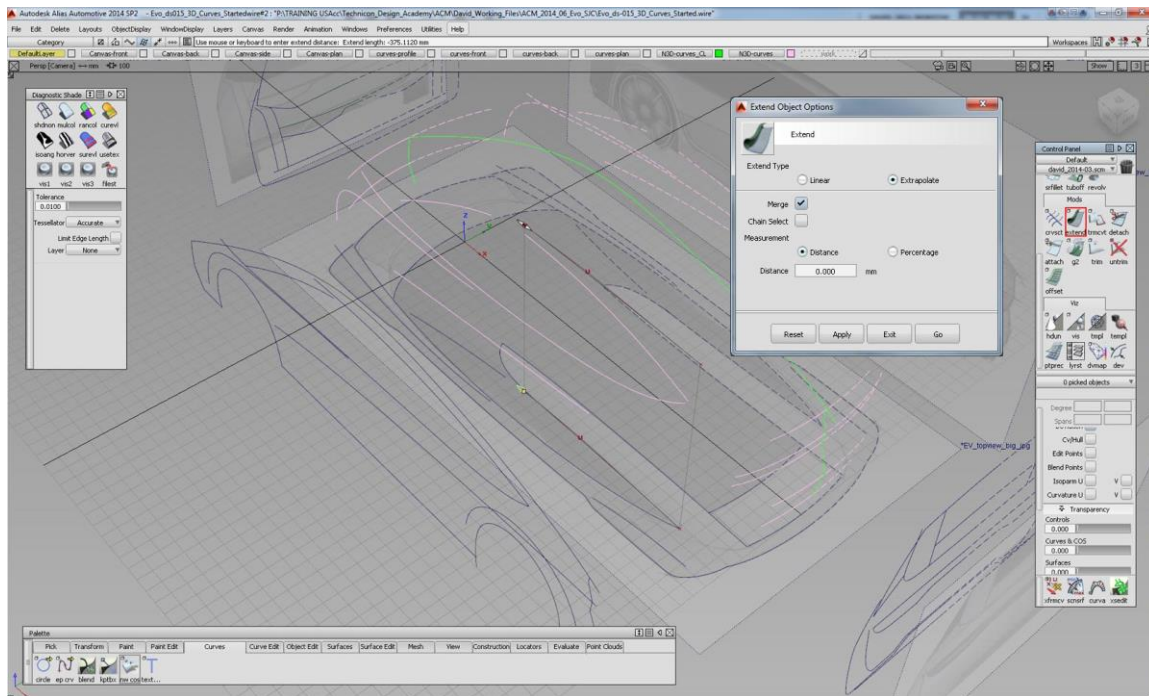

Step-5: Tie the Projected 3D Curves Together with Aligned "Corners"

Create a new curve where a corner should be, and Align it to the two projected curves. Check everything with Curve Curvature and make slight adjustments where needed.
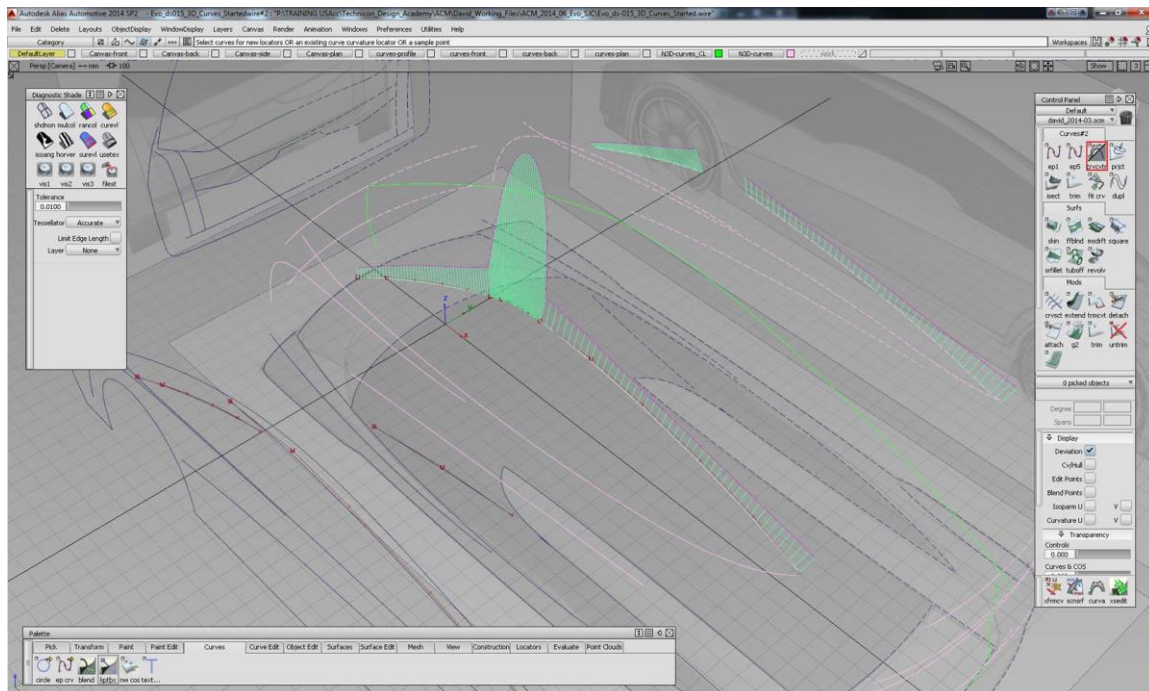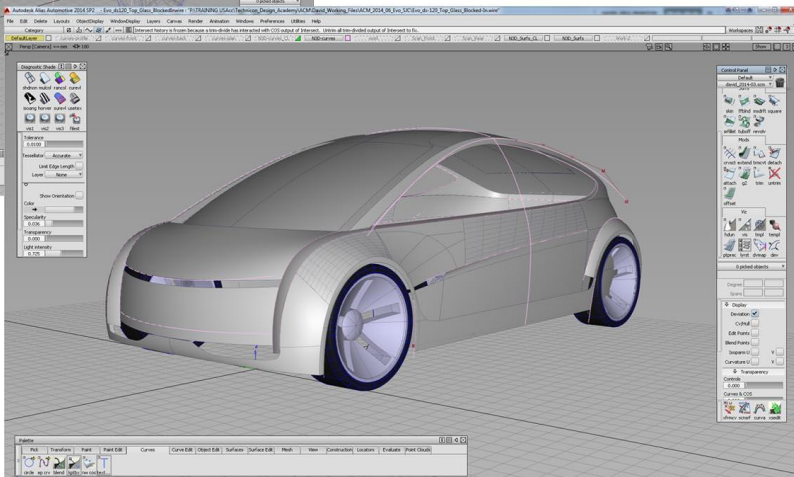
Working "Smarter, Not Harder" with a Designer Breathing Down Your Neck

Blocking-In a vehicle body is very fast once you've created the wireframe of 3D curves.
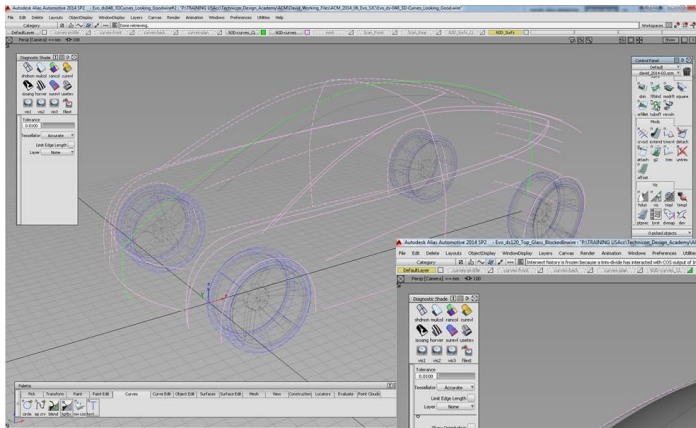
The Vehicle's Body Can be Blocked-In Very Quickly and Accurately Using Simple 'Skin' and 'Freeform-Blend' Surfaces.

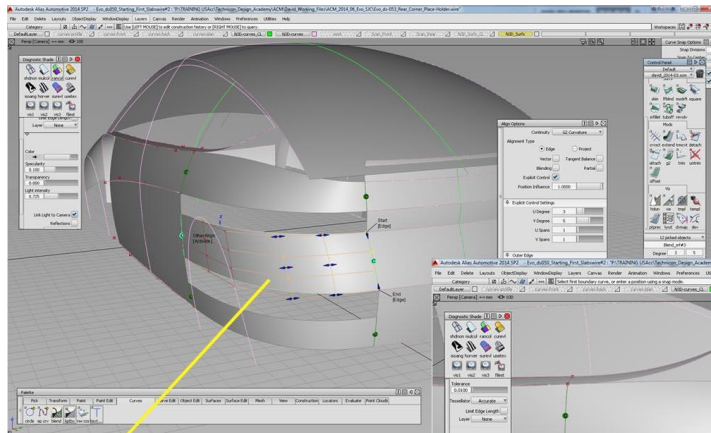## Step-6: Simple Skins in the "Easy Areas" of the Vehicle's Body

Build as many skins as possible using the 3D curves. Add a little "Proportional Crown" to start getting a feel for the volumes. Don't worry about surface transitions and fillets at this point.
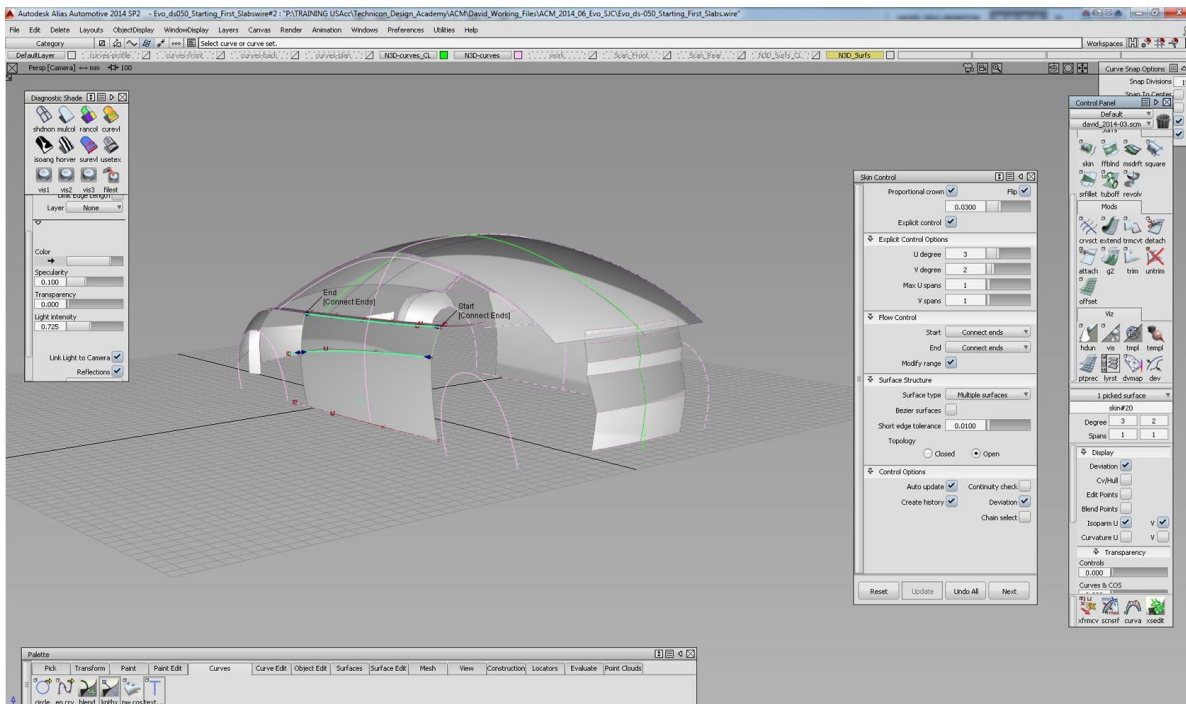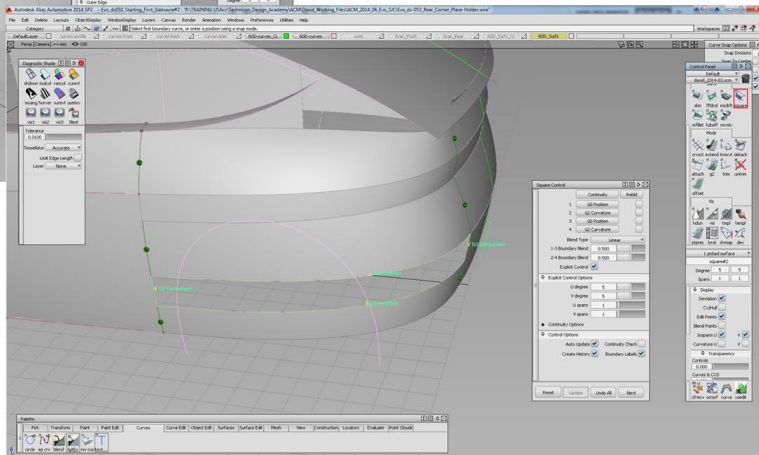
Step-7: Quick Corners of "Free-Form Blends" and "Square" Surfaces

Tie together the body-side skins with those going across the rear of the vehicle using "Free-Form Blends". Leave a space between the blends for "Square" Surfaces.


The Edges that Only require Positional Alignment Help Make the Square Surface Easier to Build in This Area.

Using Free-Form Blends Eliminates the Need to Build Additional Curves That Would Normally Drive Skin or Square Surfaces.
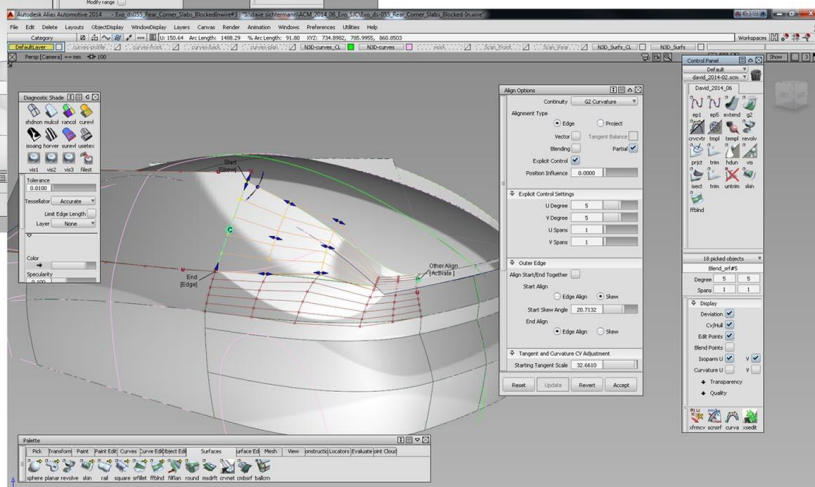
Step-8: Quick Corners of "Free-Form Blends" and "Square" Surfaces

Tie together the body-side skins with those going across the rear of the vehicle using "Free-Form Blends". Leave a space between the blends for "Square" Surfaces.
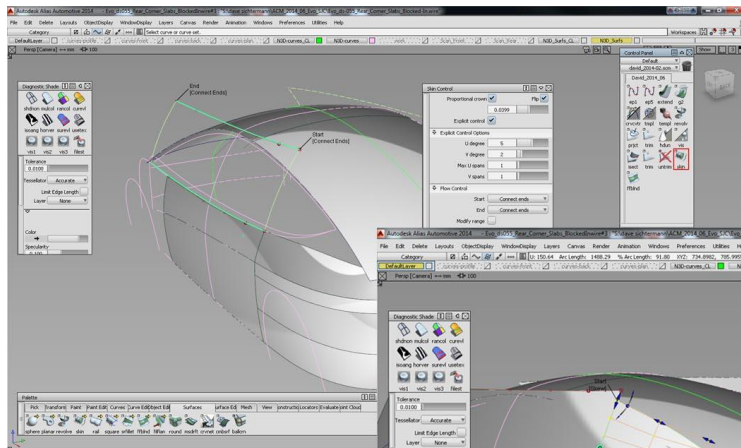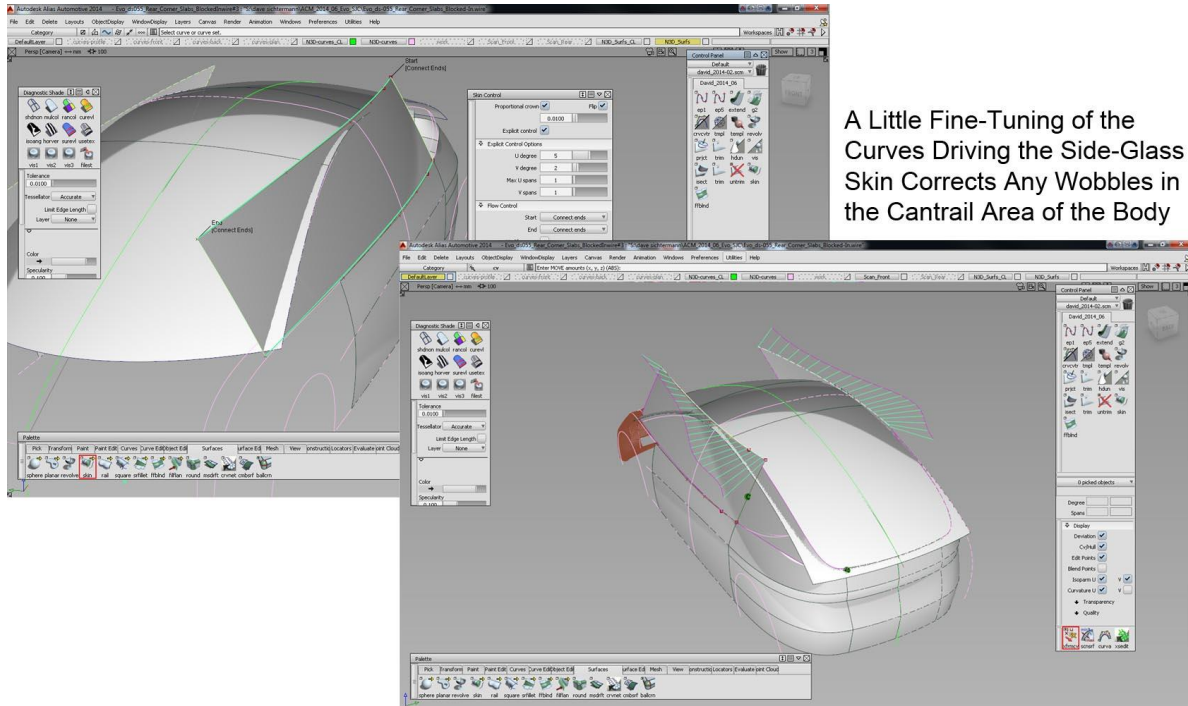

The Same Skin-and-Free-Form Blend Technique is Used to Quickly Create the "Outer Green-House" and C-Pillar Areas.

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Step-9: Refine the "Green-House" Sides to Ensure a Clean "Cantrail" Line

Adjust the side-glass skin and C-Pillar Free-Form Blend to work out the A-Pillar, Cantrail, and C-Pillar wrap-around areas.

A Little Fine-Tuning of the Curves Driving the Side-Glass Skin Corrects Any Wobbles in the Cantrail Area of the Body
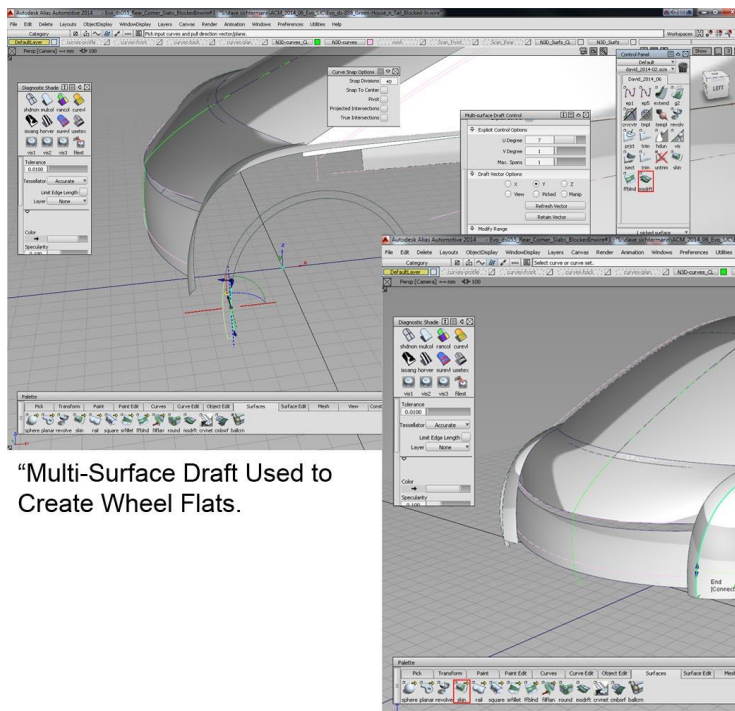
Step-10: Trim the Green-House

A simple intersect-and-trim operation yields a clean, theoretical cant rail line, from the start of the A-pillar to the rear edge of the car.
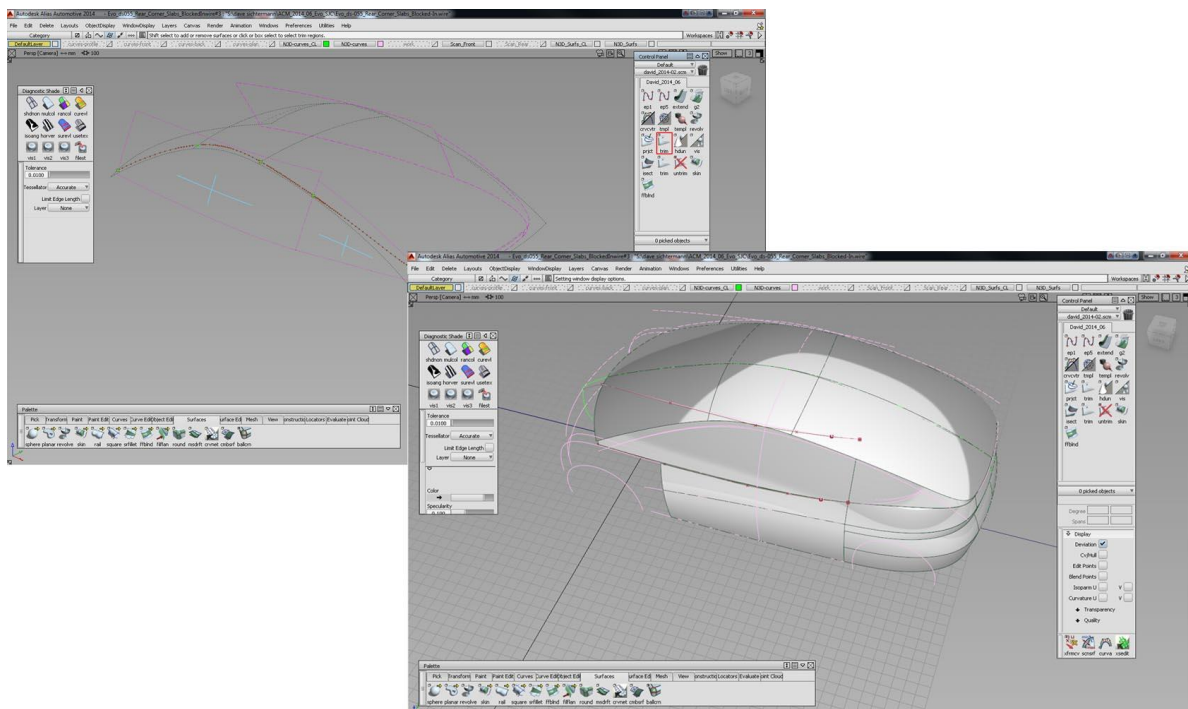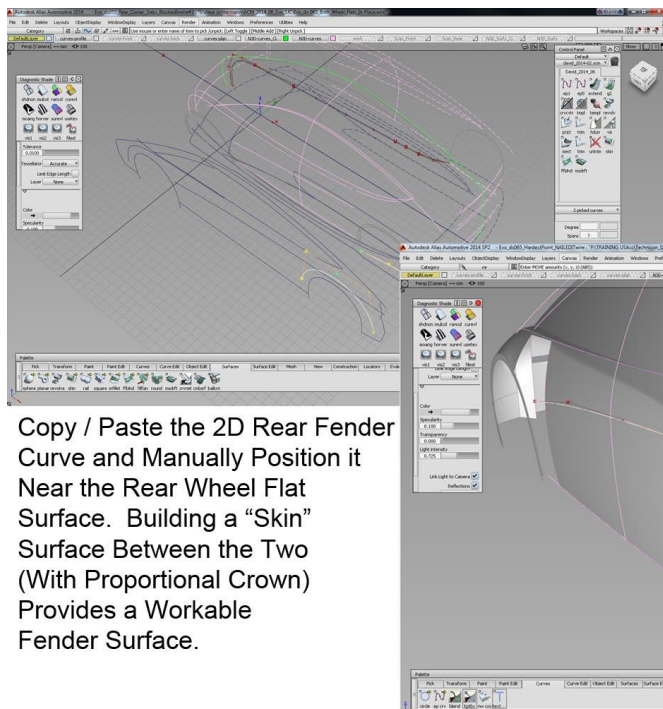
Step-11: Wheel Flats and Refined Front Fender

Rebuild Front Fender Skins, to Positionally-Aligned to New Wheel Flat Surfaces.

"Multi-Surface Draft Used to Create Wheel Flats.

Step-12: Rear Fender Area Made of a Simple "Skin" with "Proportional Crown"


The Surfaces Still Have Construction History. The Whole Body-Side can be Modified by Moving the Curves Where Needed.

Copy / Paste the 2D Rear Fender Curve and Manually Position it Near the Rear Wheel Flat Surface. Building a "Skin" Surface Between the Two (With Proportional Crown) Provides a Workable Fender Surface.

Step-13: Skins Span Across Major Areas of the Body

Build the Rocker and Bumpers Using a "Skin" Surface. "Proportional Crown" Helps to Match the Volumes Required in These Areas.

"Symmetric Modeling" Ensures the Bumper is Balanced as it is Refined to Work with the Fender.
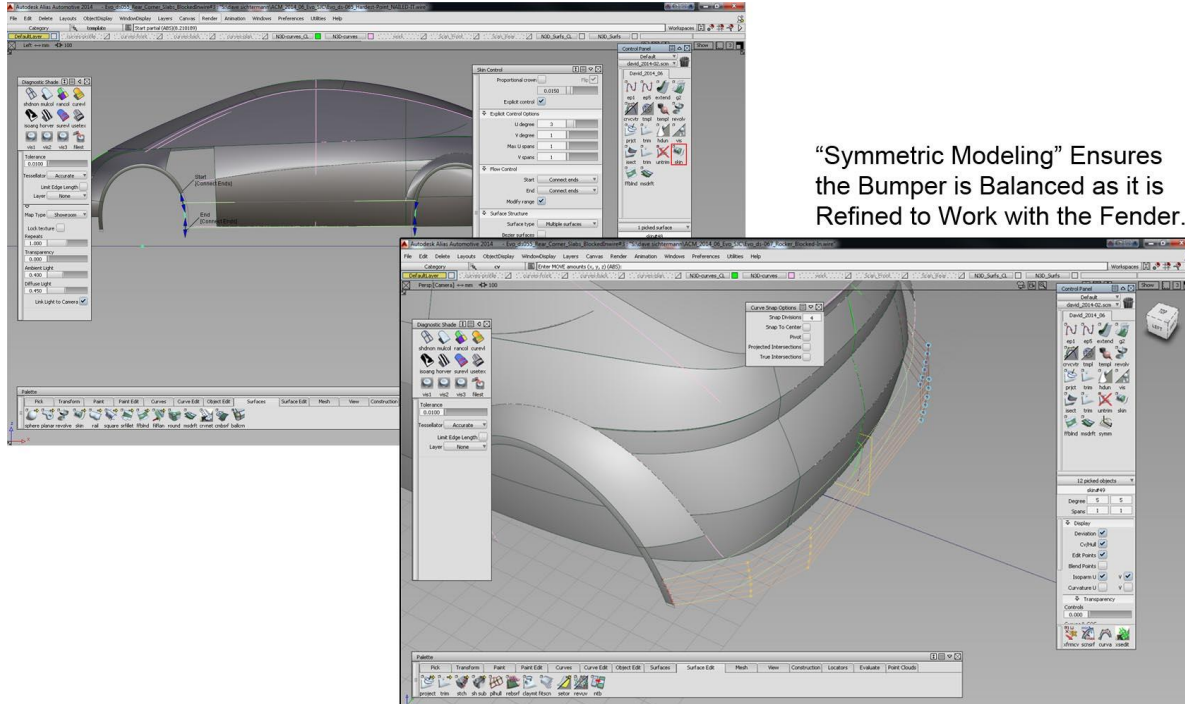
Step-14: Free-Form Blends Fill any Remaining Holes

Bridge all remaining gaps with "Free-Form Blend" surfaces. Adjust the 3D-curves and "Modify Range" settings of the surrounding skins where required in order to correct any inconsistent highlights.
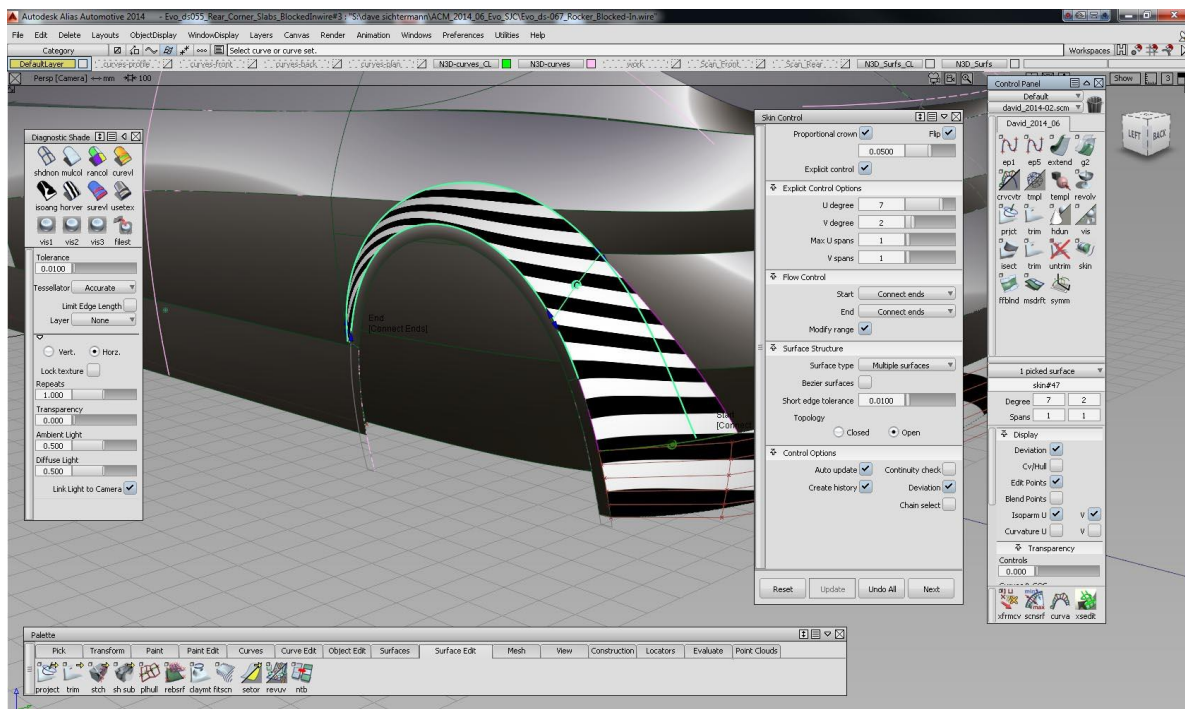
Step-15: Project 2D Curves to Body Surfaces and Trim-Out Those Areas

Fine-Tune the 2D curves in each of the "views" in areas such as the Side DLO, the front & rear fascias, and the rocker area "Light Catch." Project those curves to the relative body areas and trim them out.
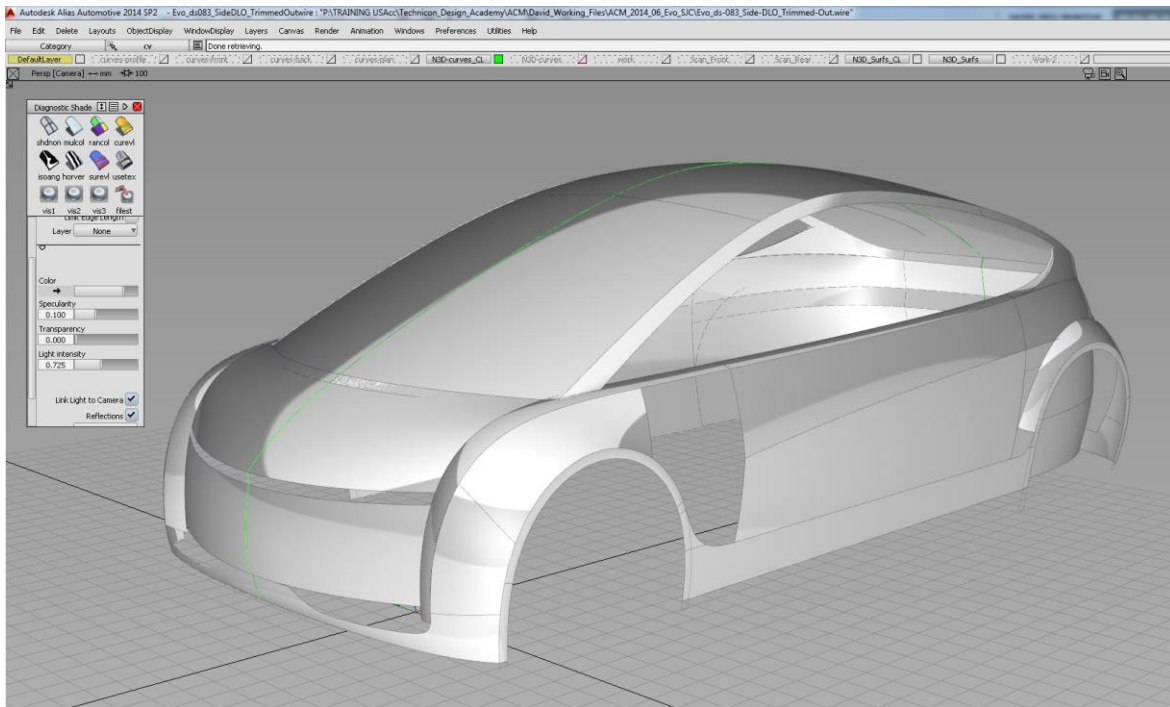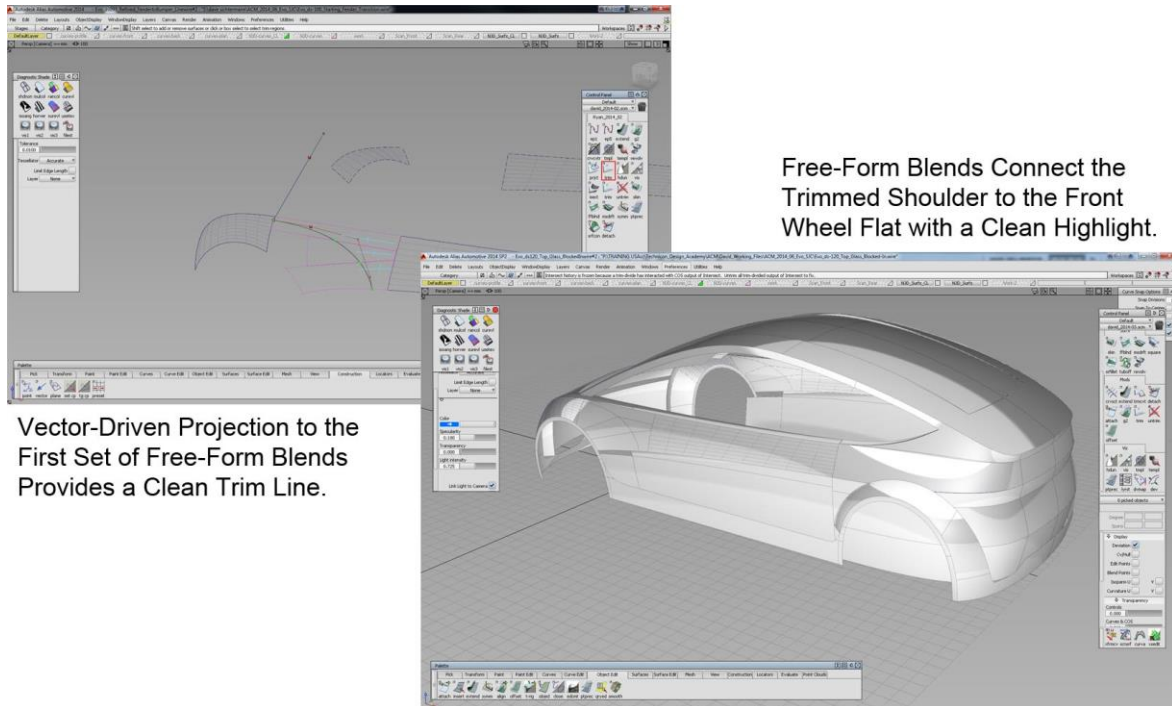

Step-16: Free-Form Blends to Start the Front Fender-to-Shoulder Transition

Use Free-Form Blends to find a clean highlight between the front fender and the shoulder.
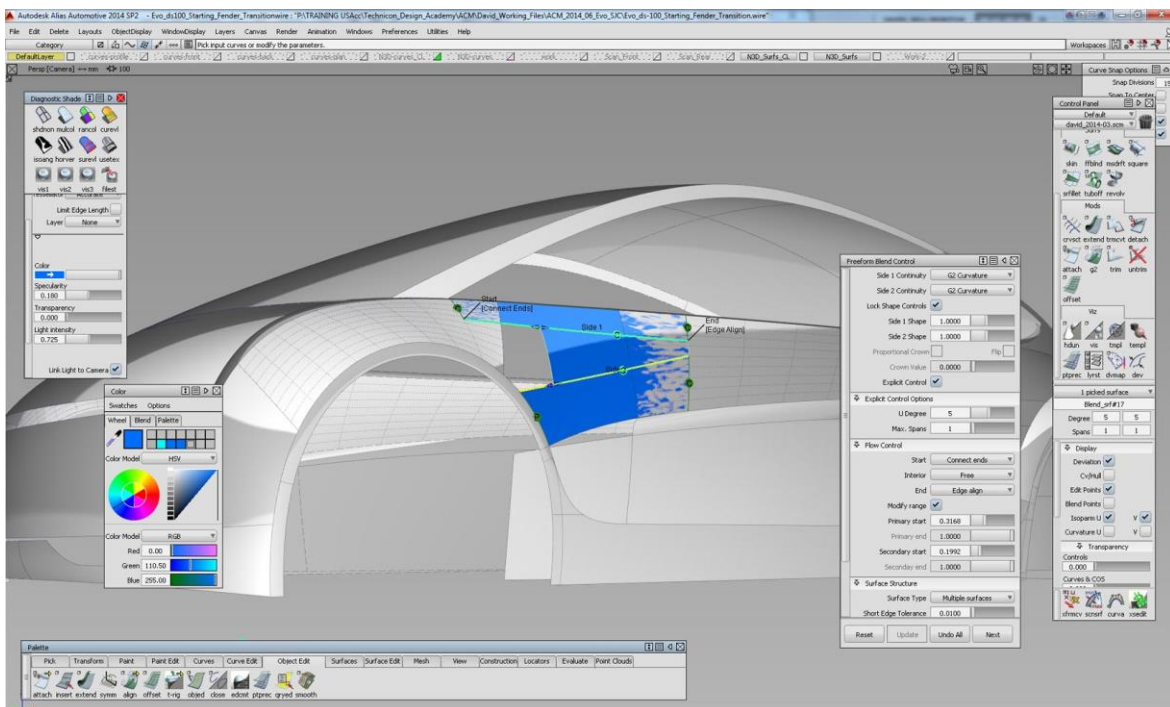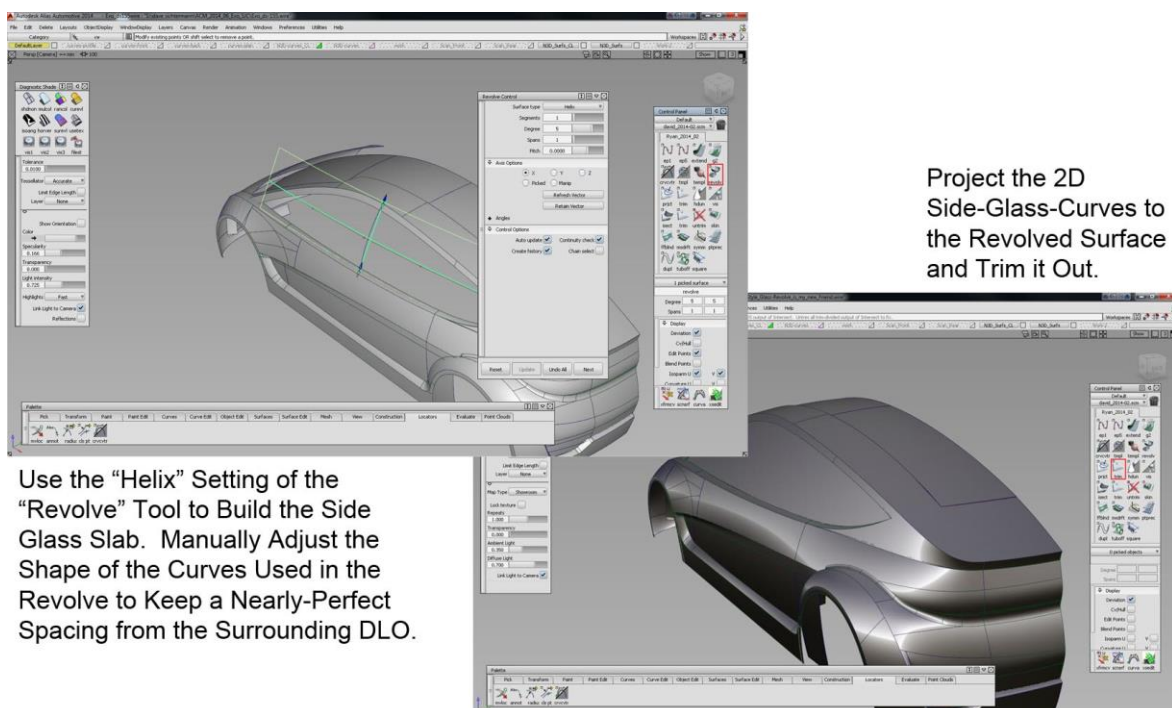
Step-17: Trim the Current Free-Form Blends and Build to the Front Wheel Flat

Design a curved path to use as a trimming tool on the current Free-Form Blends. Use a vector to find the perfect projection angle, project the curved path, and trim out that area. Build new Free-Form Blends from the trimmed edges to the Wheel Flat surfaces.

Free-Form Blends Connect the Trimmed Shoulder to the Front Wheel Flat with a Clean Highlight.

Vector-Driven Projection to the First Set of Free-Form Blends Provides a Clean Trim Line.

Step-18: Free-Form Blends to Start the Front Fender-to-Shoulder Transition

Use Free-Form Blends to find a clean highlight between the front fender and the shoulder.

Project the 2D Side-Glass-Curves to the Revolved Surface and Trim it Out.

Use the "Helix" Setting of the "Revolve" Tool to Build the Side Glass Slab. Manually Adjust the Shape of the Curves Used in the Revolve to Keep a Nearly-Perfect Spacing from the Surrounding DLO.

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Moving On: When to Let Go of the Past Using "History Zoning"

At this point, all "Theoretical Edges" are in place and shouldn't move. The next step is to start working on transitions and fillets. This will require a lot of trimming. In order to prevent any surfaces from moving around as major parts of the body are trimmed, Delete Construction History on all of the current surfaces.
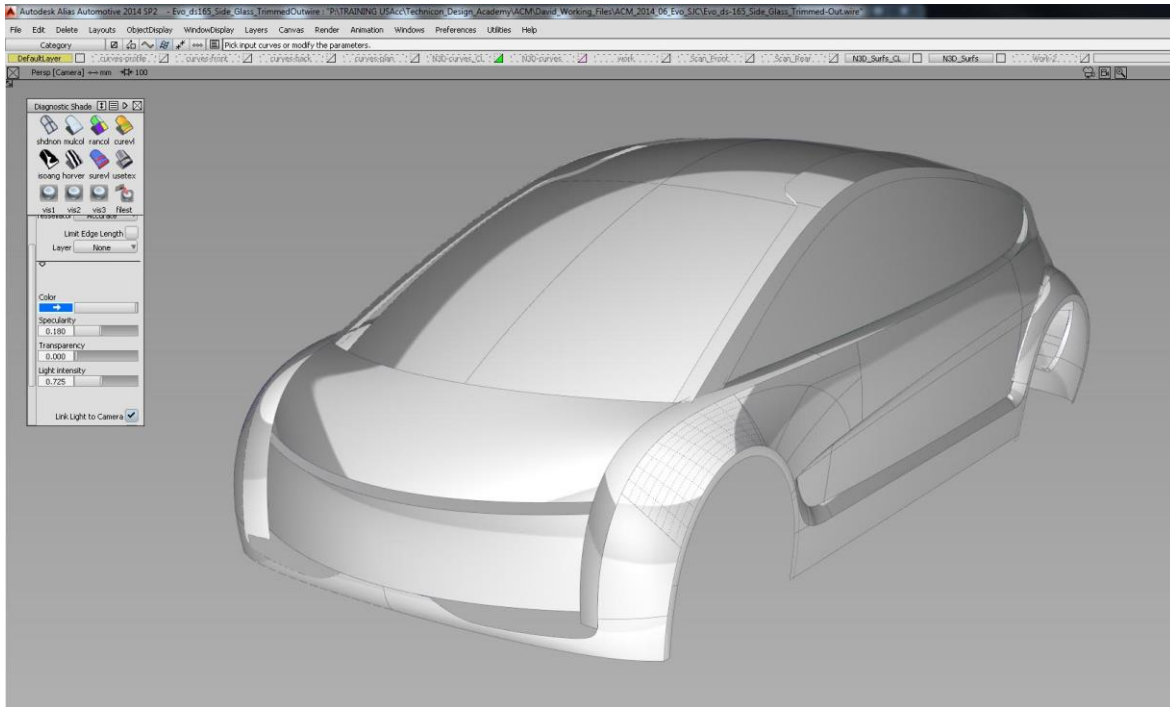
## Step-19: Trim the Cant Rail Areas and Build Free-Form Blends

The current Cant Rail edge is a Theoretical and needs to be trimmed slightly down the side of the car as well as into the top.

First, design a 2D shape to use as a projecting and trimming tool for the top of the car. Trim those areas out, and do the same for the side of the car in the same areas. Use Free-Form Blends to build an accelerated corner from the top of the car to the lowered side edge.
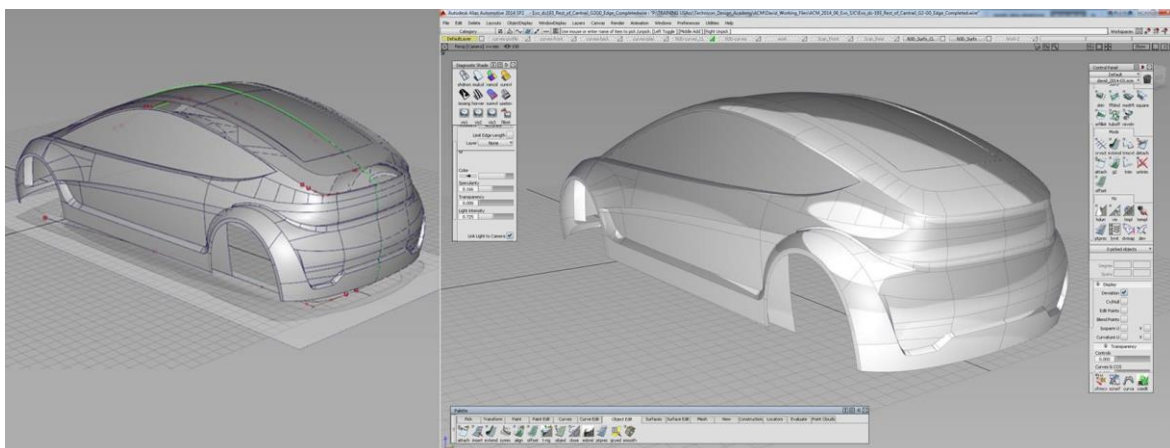
Step-20: Build Transitions Around the Back of the Car

Similar to the steps used for the Cant Rail area of the car: design a trim tool in 2D; project those curves to the areas of the surfaces; trim those surfaces out, and build Free-Form Blends in those trimmed areas.
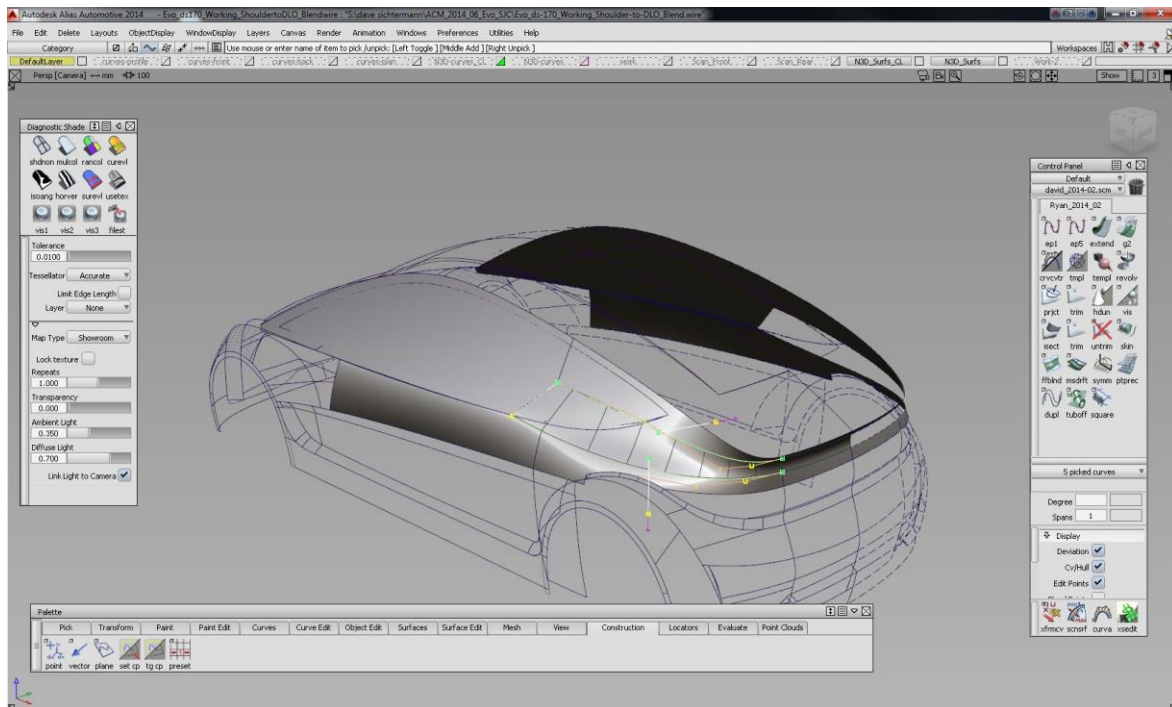

Step-21: Build Fillets Around All Theoretical Edges, Leading Up to Y-Transitions

Use the "Surface Fillet" tool to run fillets around all remaining Theoretical edges, saving any Y-Transitions for last.

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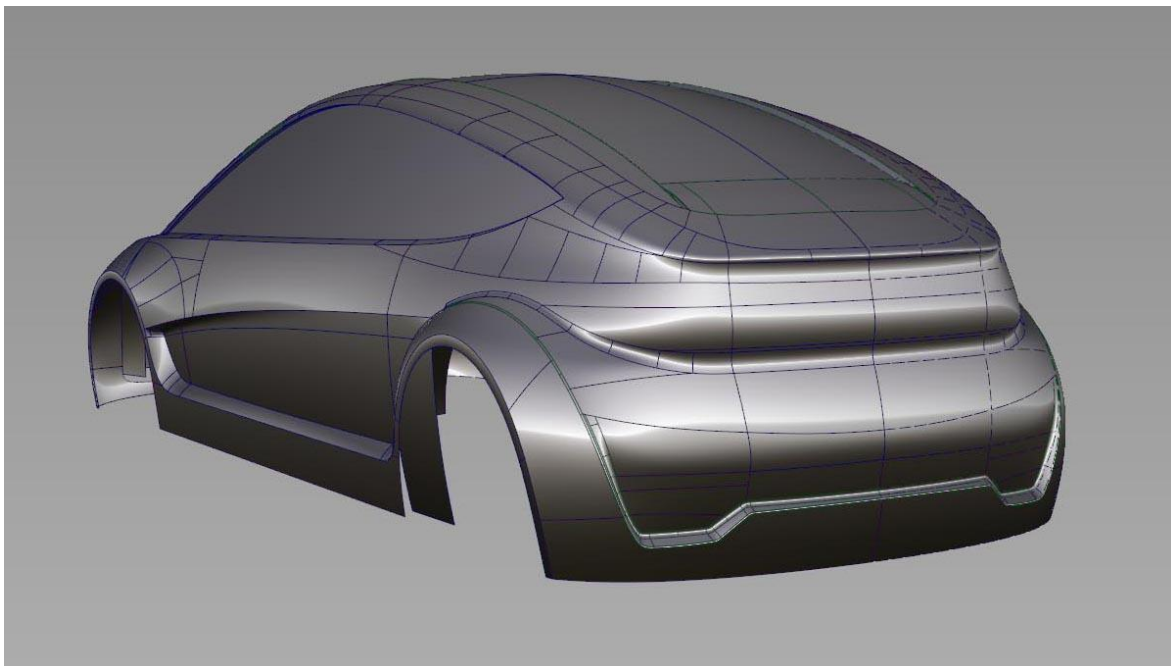
Step-22: Build Y-Transitions

The final step of the build, use a combination of "Free-Form Blend" and "Square" surfaces to connect the areas where multiple fillets come together.
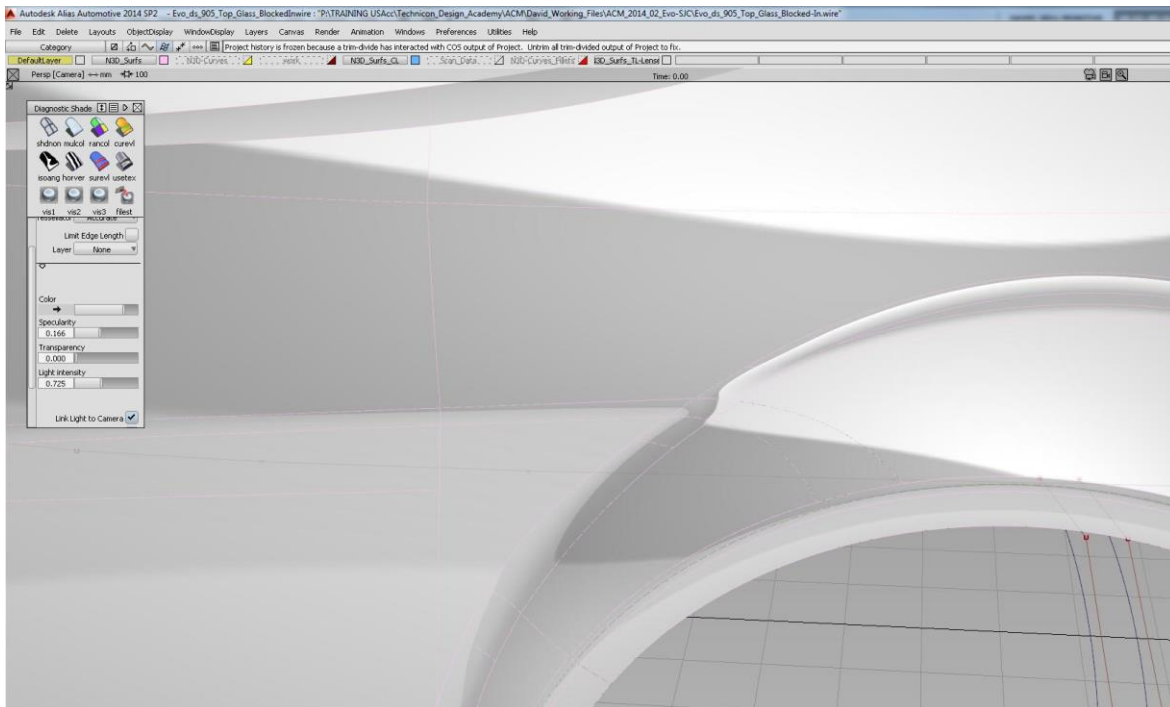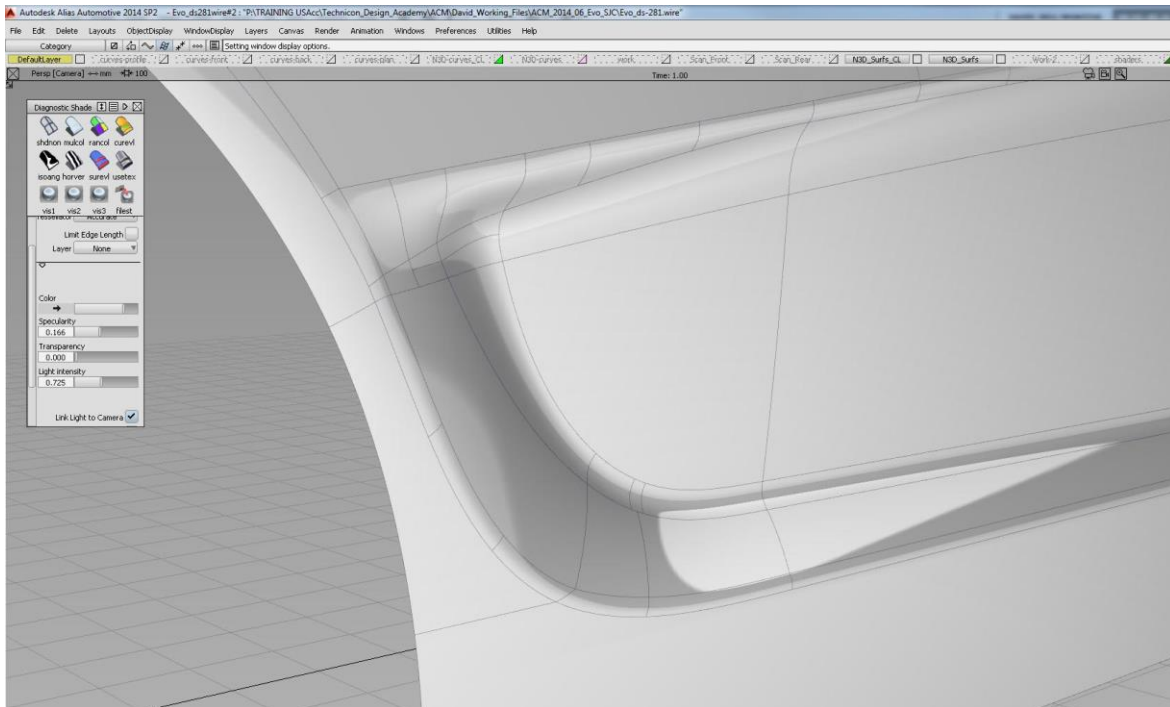
Thank you for your time.

I hope this brief presentation proves worthwhile.

Please contact me if you have any questions.

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