

Racing Games: A Sound Study

Presented by Damian Kastbauer

Study by Damian Kastbauer David Nichols

Lost Chocolate Lab and Track Time Audio

Why Racing Games?

- An opportunity to experience something most players will never get to achieve in the real world
- A look into the difficulty of mastering a professional sport

What Sounds Matter?

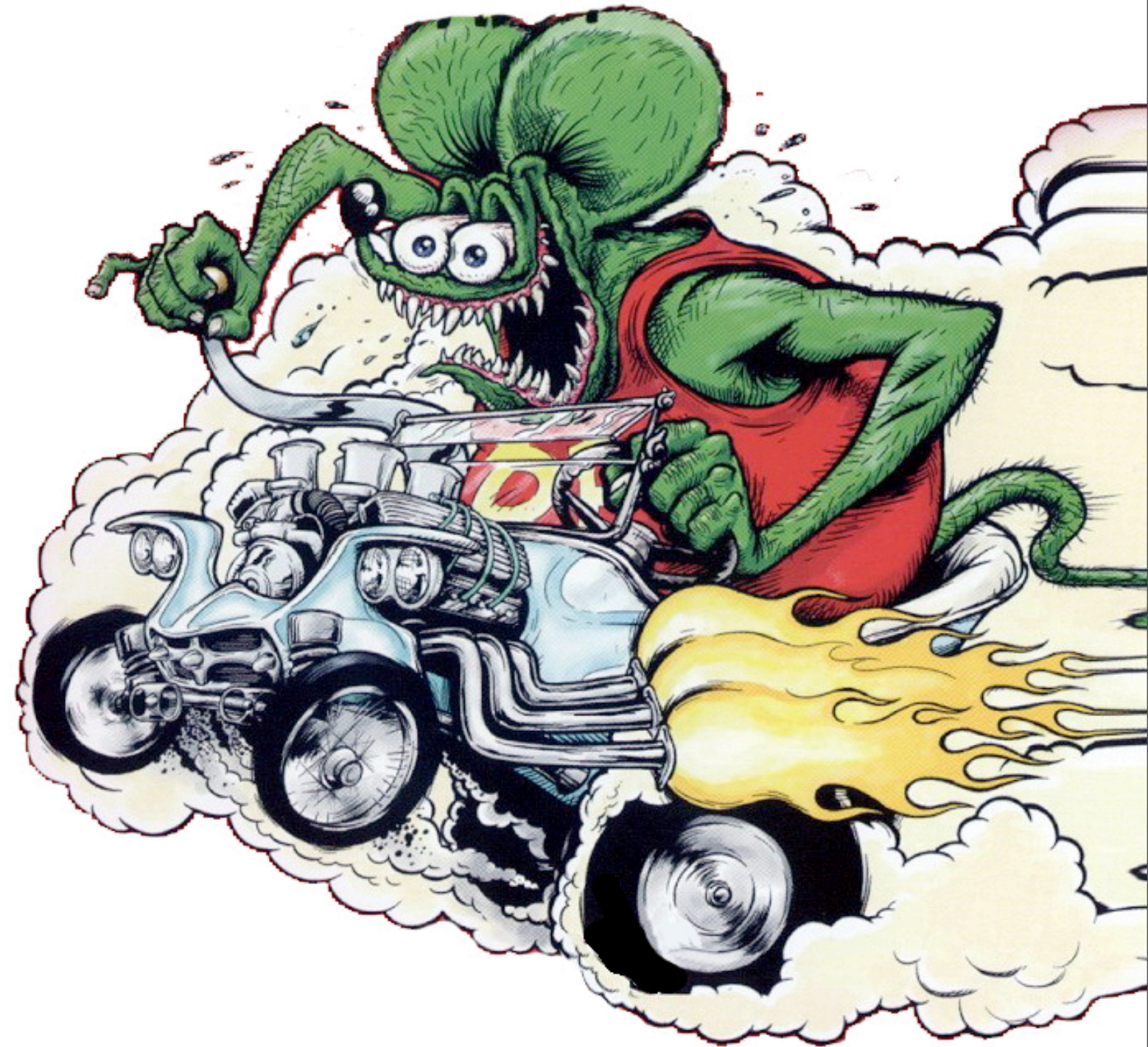
- Sound is crucial to the driving experience in a number of ways. The tires communicate what the road surface is like and how close to the limit of traction they are at. The sound of the engine tells the driver what the car is feeling, when to shift, and how powerful the car is.
- Tire sound
- Engine sound
- Environment sound

Where We've Been



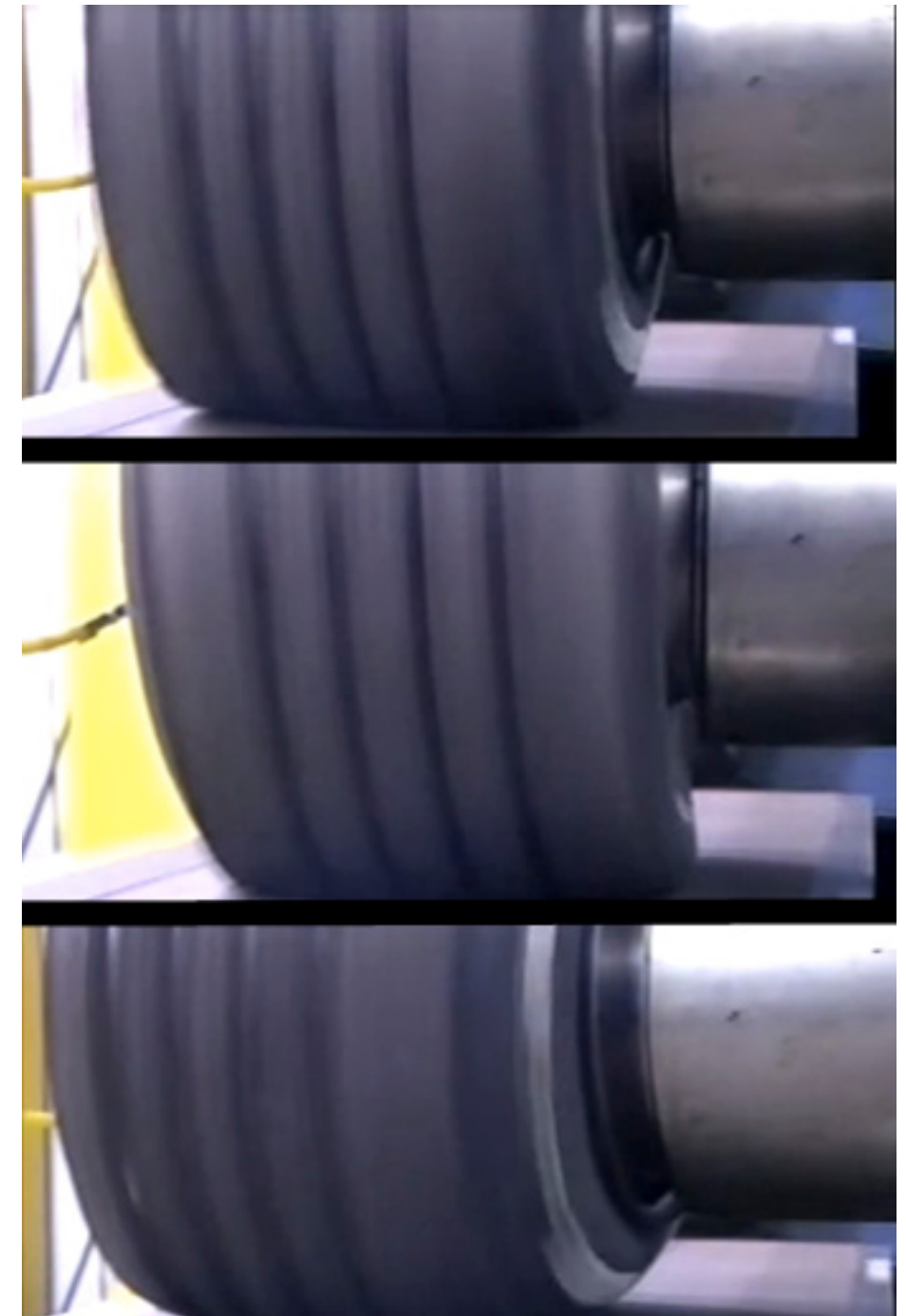
Today's Discussion

- Tire behaviors
- Engine behaviors



Tire Behaviors

- A tire can offer up to X amount of grip, based on construction and size.
- As force approaches that limit, a tire will hum or rumble.
- As a tire exceeds its grip limit, it will squeal. The frequency of the squeal is determined by the amount of pressure on the tire.



Current-Gen Samples



- <http://vimeo.com/26117389>

What You Heard...

- More accurate transitional phase as grip moves from rolling to howl to squeal
- Four-wheel independent pitching (a la FM3)
- Ease of identifying howl state given speaker systems

Engine Behaviors

- Engine RPM and the fundamental frequency of the sound are closely linked.
- The relationship of harmonics to fundamental will shift with the amount of load on the engine (IE how hard it's working).
- As RPM changes up or down, the sound changes in frequency smoothly.

Current-Gen Samples

- <http://vimeo.com/26134932>

What you heard...

- Smoothness between samples as RPM increased
- Difference between on-load and off-load samples and DSP
- Layers of character
- Granular imperfections

For More Info...

- David's vehicular audio blog:
 - <http://www.tracktimeaudio.com>
- Damian's blog:
 - <http://www.lostchocolatelab.com>
- Designing Sound
 - <http://www.designingsound.org>