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• *YouTube videos by Cambridge mathematician Tadashi Tokieda:*

"Math Encounters - Toy Models: Extracting Mathematical Surprises from Everyday Life,"
"Mathematics with Paper Clips, Ribbon, Rubber Bands (MathByte)" and "Toy Models"
tinyurl.com/WS-Tad1
tinyurl.com/WS-Tad2
tinyurl.com/WS-Tad3

A year ago (WS Jan. 2019) I reported on "the coffee cup acoustics" demonstration explained by Professor Tokieda amongst others. Since then, several folks have directed me to a number of videos by Tokieda analyzing other interesting "simple" phenomena, including his "Toy Models" talk. Besides the coffee cup demo, he examines the end cycloids of a fast-spinning tube, phase transition-like behaviors of wooden balls sloshed in a bowl, vibrationally walking a nut along a bolt, rolling polygons, making regular n-gons from knotted, tightened, and flattened paper strips, rolling cylinders partially filled with granules moving viscously and inviscidly, and the infamous self-filling unsealed paper balloon. A nice hands-on activity with a paper strip, paper clips, and rubber bands ends the Princeton video, and is then explored at greater length in the second *Mathbytes* video. His third (2014) video from the Princeton Institute for Advanced Study looks at spinning toys—celts, eggs, tippy-tops (including a full explanation)—and ends with disks, coins, and a bracelet all spinning and flapping on a curved mirror (the famous Euler's disk), developing and testing a model for frequency vs. time of finite repeated collisions phenomena. These are fun videos for you or perhaps your gifted students to investigate. There are other Tokieda videos on YouTube also worth examining, some of which overlap the above topics.

Submitted by Sam Sampere of Syracuse University physics

• *Teachers can unwind and learn watching YouTube Electrical Fun: Big Clive and ElectroBoom*

tinyurl.com/WS-BigClive1
tinyurl.com/WS-EB1

Manx Scotsman and YouTube electrical engineer Big Clive runs what he describes as "the trashiest electronic channel on YouTube," providing dissection-like teardowns and construction projects mainly aimed at theater-themed sound and lighting projects like sequencers, chasers, and light decorations. Some of his videos I particularly enjoyed included "Adding Electrolyte to a Fake (Dry) Capacitor," which dissects and attempts to revive what should have been a factory-reject capacitor and extensively discusses electrolytic capacitor manufacture (as do some expert viewer comments). I also recommend particularly his "Inside the Poundland Electric Fly Zapper Bat" (widely used for nonlethal homebrew high voltage projects, get them at Harbor Freight stores in the United States), and "Flappy Solar Ornaments" (common dollar store toys containing pendulum drives). I enjoyed Clive's dissection of the cheap 240-V electrical bathroom hot water device, "Inside a Heated Shower Head (Suicide Shower)," his dissection of a lithium battery (they're apparently filled with fire) in "Shorting Out a Fully Charged Cheap Lithium Jump Starter," and "Sudden Science – Driving Fluorescent Tubes Properly," as well as his many videos related to LED lamps, bulbs, and lamp drivers (truly his forté). He's great for learning the electronics of everyday items whilst being entertained. Beware his jokes and infrequent profanity, and some of these projects are certainly inappropriate for students; but you should go watch Clive take some things to bits today.

I have previously written of (WS Nov. 2017) of the many comedic/educational antics of Iranian-Canadian electrical engineer Mehdi Sadaghdar on his Electroboom YouTube channel. Though he spends considerable time doing Jerry Lewis-like electrical pratfalls, he also has helped me learn some terrific insights into unsafe electrical devices and situations, as well as why household circuitry behaves as it does. See especially his videos testing his GFC and live wires with his leg in the bathtub (tinyurl.com/WS-EBtub) and again experimentally evaluating the preceding Big Clive analysis of the "suicide shower" ("How Safe Is the Shower Head of Doom," same link). Another insight for me was why and under what circumstances household wiring return/neutral and earth safety are not both at 0-V potential, taken from Mehdi's experimentation and analysis video "Free Energy Discovered in Ukraine" of a Ukrainian hacker trying to produce "free energy" from this common voltage difference. Also his attempts to hack 240-V from two separate household 120-V circuits in "Finding HIGH POWER 240V in a 120V Country" were eventually instructive, and as a fan of simple motors I appreciated his recent "Super Simple DC Motor" and learned some new things that can go wrong from that, while enjoying Mehdi's musical dramatic stylings in his "Lion King"-inspired "Right Hand Rule" song and dance. Unfortunately, these videos are also not classroom suitable, but definitely excellent physicist-with-alcohol and popcorn laughing and learning kind of watching.