

WebSights features announcements and reviews of select sites of interest to physics teachers. All sites are copyrighted by their authors. This column is available as a web page at PhysicsEd.BuffaloState.Edu/pubs/WebSights/. If you have successfully used a physics website that you feel is outstanding and appropriate for WebSights, please email me the URL and describe how you use it to teach or learn physics—macisadl@buffalostate.edu.

• **The U.S. Fourth National Climate Assessment report calls for adaptation and mitigation; now includes observed examples and economic impact analysis of climate change in the United States**

[nca2018.globalchange.gov/
tinyurl.com/WS-4thClimateReport](https://nca2018.globalchange.gov/tinyurl.com/WS-4thClimateReport)
xkcd.com/1732/

Climate change has already started to damage the U.S. economy, environment, and human health, and some future damage is now unavoidable (locked-in), according to this report from 13 U.S. government agencies. The *Physics Today* article points out that adaptation, mitigation, and suffering are all choices we are currently exploring. Volume I discusses the climate science, and Volume II discusses impacts risks and adaptation. The report discusses specific impacts on communities, economy, water, health, indigenous peoples, ecosystems and service, agriculture, infrastructure, oceans and coasts, and tourism and recreation. Much opportunity for adaptation and mitigation is still possible, and with aggressive action much could still be done to reduce the causes of climate change itself, as well the ensuing effects. Physicist-cartoonist Randall Munroe produced a nice related graphic cartoon examining the history of Earth's "small" temperature changes since the last ice age 20,000 years ago, ending with our current trajectories in this unfortunate experiment we are conducting.

• **Physics InSight Slide Show**

www.aps.org/careers/insight/download.cfm

The American Physical Society creates a wide variety of recruiting posters, comic books, videos, reports, career guidance, tools for advisors, etc. trying to draw people into physics study and physics careers. The Insight slide show (updated regularly and intended to be left running on a computer or video display) puts some of the best of these materials into PowerPoint slides and movie files available for free downloads.

This particular update includes:

- Profiles of Bonnie Fleming, a physics professor who studies neutrinos; Debbie Berebichez, a high-energy PhD physicist who works on Wall Street and is the next "Oprah" of science; Kathy McCormick, a nuclear physicist who works for the U.S. Dept. of Homeland Security; and SPS Intern Tabitha Colter, who spent her summer working in science policy
- Data highlighting the top activities of physics PhDs working in the private sector, and the skills and knowledge commonly used by physics BS grads working in industry
- Information about the Conferences for Undergraduate Women in Physics (CUWiP), APS Job Center, and the

APS Professional Guidebook

- Information on neutrinos, gravitational waves, Geiger counters, and the science behind a common appliance--dishwashers!

Submitted by Crystal Bailey (bailey@aps.org)

• **Tesla coil projects for students**

instructables.com/id/Simple-Tesla-Coil/
www.unisonic.com.tw/datasheet/MJE13009.pdf
youtube.com/PlasmaChannel
tinyurl.com/WS-BugZapTC

As we wrap up fall semester, my students are now presenting and documenting their end of course projects. For several years, I have been intrigued by low-cost, simple-construction homemade Tesla coils on the web (my E&M students love Tesla coils). To date, we have had success only in making traditional coils using purchased high-voltage capacitors (no saltwater-filled wine bottles, please) and excitation spark gaps, or more recently a \$3 bug zapper racket power supply—see Plasmachannel. This semester we finally got a semiconductor-driven coil to work repeatably and survive-ably, using an MJE13009, transistor from the Instructables YouTube channel (use a heat sink, and we destroyed several dozen other transistors, so go for the high-power MJE). Yes, Virginia, you can build a Tesla coil on a \$1 transistor. Alternatively, one can buy a cheap plasma globe (Google those three words) for under \$10 and deconstruct it. You know deep inside that you really want to build a Tesla coil.

• **Coffee/Hot chocolate cup acoustics**

<https://www.quantamagazine.org/tadashi-tokieda-collects-math-and-physics-surprises-20181127/>
tinyurl.com/WS-CupWalker
tinyurl.com/WS-EntrainedAir
tinyurl.com/WS-RussellHC
tinyurl.com/WS-RussellWG

I was recently pointed to yet another excellent coffee cup resonance video, this time from *Quanta Magazine*, featuring Stanford mathematician Tadashi Tokieda. The sound reproduction is particularly good on this video (and the online magazine site is also good). Also, the more traditional "hot chocolate effect" from Jearl Walker's Flying Circus of Physics site, which now hosts two dozen videos. His video about entrained air is replicated by others, this can be done reliably with simple stirring. Dan Russell's hot chocolate effect video is also good (with a thorough explanation), and his short wineglass flexure strobe video closes the loop to see what Professor Tokieda was describing in the first video. Now that the cold weather is here, it's hot chocolate cup physics time. And wine of course.