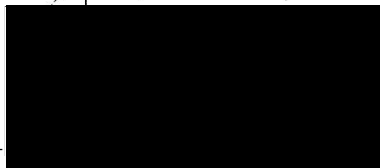


Committee on Energy and Commerce
U.S. House of Representatives
Witness Disclosure Requirement - "Truth in Testimony"
Required by House Rule XI, Clause 2(g)(5)

1. Your Name: Dave Cooke		
2. Your Title: Senior Vehicles Analyst		
3. The Entity(ies) You are Representing: Union of Concerned Scientists		
4. Are you testifying on behalf of the Federal, or a State or local government entity?	Yes	No X
5. Please list any Federal grants or contracts, or contracts or payments originating with a foreign government, that you or the entity(ies) you represent have received on or after January 1, 2015. Only grants, contracts, or payments related to the subject matter of the hearing must be listed.		
6. Please attach your curriculum vitae to your completed disclosure form.		

Signature: _____



Date: December 10, 2017

[Union of Concerned Scientists

Science for a healthy planet and safer world

Dave Cooke

Senior Vehicles Analyst

Dave Cooke is a senior vehicles analyst in the Clean Vehicles Program, specializing in both light- and heavy-duty fuel economy. He conducts research on fuel efficiency technologies and the implications for oil consumption and greenhouse gas emissions across the transportation sector.



Before joining UCS, Dr. Cooke was a Mirzayan Science and Technology Policy Fellow and associate program officer with the National Academies' National Research Council, where his work with the Board on Energy and Environmental Systems focused on automotive technologies, including peer-reviewed consensus studies on the development of advanced technology vehicles by 2050 and the barriers facing electric vehicle deployment.

Dr. Cooke received his Ph.D. in condensed matter physics in 2010 from the University of California, Berkeley, where his dissertation focused on the fundamental science behind modern hard drive technology, exploring the electronic and magnetic properties of these novel material systems through microcalorimetry. Prior to this, he received his BS in physics from Harvey Mudd College in 2002 and his MS in physics from the University of California, San Diego in 2004.

David W. Cooke, III

Union of Concerned Scientists

EDUCATION

University of California, Berkeley, CA

Ph.D. in Physics

2010

Dissertation: *Thermodynamic Measurements of Applied Magnetic Materials* (December 2010)

Advisor: Frances Hellman

University of California, San Diego, CA

M.S. in Physics

2004

Harvey Mudd College, Claremont, CA

B.S. in Physics

2002

POLICY EXPERIENCE

Union of Concerned Scientists

Clean Vehicles Program

Senior Vehicles Analyst

2015-Present

Fulfilled duties listed for Vehicles Analyst position as well as the following:

In coordination with Deputy Director and Research Director, set research objectives and goals and coordinated overall research projects.

Wrote and edited technical and policy papers, magazine/journal articles, and other materials for publication.

Collaborated with analytic, policy, outreach, and media staff to apply research results and conclusions to the formulation and development of public policies, political strategies, and communication efforts to promote viable transportation and oil saving technologies and strategies.

Provided technical information and expertise through written materials and public speaking. Actively promote promising legislation through letters of support and other lobbying efforts.

Union of Concerned Scientists

Clean Vehicles Program

Vehicles Analyst

2013-2015

Lead analyst on heavy-duty and light-duty vehicle efficiency regulations.

Produced fact sheets, testimony, blogs, and other analytic materials for both internal and external audiences.

Represented UCS in external settings, including public hearings and technical meetings.

The National Academy of Sciences

Board on Energy and Environmental Systems

Associate Program Officer

2012-2013

Coordinated teams of experts in analysis of energy and efficiency projects.

Developed chapter on economic modeling of the transition to alternatively-fueled vehicles under intense time pressure.

Produced internal report summarizing literature on advanced vehicles.

Organized forums on natural gas, critical materials, sustainability, vehicle costs, and the resilience of the electric power system.

Edited reports on solid-state lighting, hydrokinetic power, and alternatively fueled vehicles.

The National Academy of Sciences

Board on Energy and Environmental Systems

Mirzayan Science and Technology Policy Fellow

Fall 2011

Synthesized technical research for inclusion in various committees' reports.

Environmental Protection Agency, Region 9

Goldman School of Public Policy (UCB) Consultant

Spring 2011

Worked with EPA and GSPP to determine what EPA can do in San Joaquin Valley to mitigate impacts of air quality on this impoverished area of CA.

RESEARCH EXPERIENCE

University of California, Berkeley, CA

Graduate Student Researcher / Junior Specialist

2004 – 2011

Micromachined heater stage – Developed use of calorimeter as in-situ heater stage (Ref. 8); worked with Stanford researchers to grow biaxially-oriented MgO in order to measure epitaxial thin films (Ref. 6)

The metamagnetic transition of FeRh alloys — Worked with the Center for Magnetic Recording Research at UCSD to obtain Fe-Rh alloys that undergo an AF>FM transition just above room temperature; measured the specific heat of equiatomic and Fe-rich alloys (where the transition is suppressed) to observe an anomalous signature representative of the thermal fluctuation model of the transition (Ref. 10); photoemission examined electronic DOS around $T_{AF>FM}$ (Ref. 9); magnetic moment orientation was studied via Mössbauer spectrometry (Ref. 11)

Probing the Fe/Cr multi-layer interface — Collaborated with Hitachi Global Storage Technologies' San Jose Research Center to obtain industrial-grown Fe/Cr multi-layers with high GMR; sputtered Fe/Cr multi-layer structures under various growth conditions to alter interfacial properties; used fabricated microcalorimeters to examine the density of states at the interface of these films (Ref. 5)

Disorder in sputtered Cr films — Examined electronic and phononic densities of state (DOS) in sputtered Cr by altering growth conditions; measured DOS through specific heat measurements on thin-film calorimeters (Ref. 3); compared results to resistivity measurements (Ref. 4) to form cohesive picture

Small sample calorimetry — Developed technique to mount samples too small to be measured by traditional bulk techniques (1-100 μ g); first specific heat measurements of Fe₂SiO₄ spinel, a high-pressure (multi-anvil cell) material found in the earth's mantle (Ref. 1); oversaw undergraduate student to develop and run a MATLAB simulation of this technique (Ref. 2)

Microfabrication of "calorimeter on a chip" — Worked in on-campus micro-fabrication facility to make membrane-based calorimeters for use with micro-grams of material (thin films and small samples)

University of California, San Diego, CA

Graduate Student Researcher

2003 – 2004

High temperature calorimetry — Redesigned differential scanning calorimeter (DSC) for use as a high-temperature semi-adiabatic relaxation calorimetry system for use with micro-machined calorimeters

INTERNSHIPS

Quantum Design, San Diego, CA

Quality Assurance Intern

2001

Harvey Mudd College, Claremont, CA

Lab Technician

2000

TEACHING EXPERIENCE

University of California, San Diego, CA

Teaching Assistant

2002 – 2003

Harvey Mudd College, Claremont, CA

Lab Assistant

2000 – 2001

Harvey Mudd College, Claremont, CA

Grader

1999 – 2002

TRANSPORTATION PUBLICATIONS

Reports

3. *Time for a U-Turn: Automakers' History of Intransigence and an Opportunity for Change.* **Cooke, D.** Union of Concerned Scientists, December 2017. Online at www.ucsusa.org/automaker-uturn.
2. *Engines for Change.* **Cooke, D.** Union of Concerned Scientists, March 2015. Online at www.ucsusa.org/enginesforchange.
1. *Automaker Rankings 2014: The Environmental Performance of Car Companies.* **Cooke, D.** Union of Concerned Scientists, May 2014. Online at www.ucsusa.org/autorankings2014.

Technical/Whitepapers

4. "The SUV Loophole: How a changing sales mix is affecting the efficacy of light-duty vehicle efficiency regulations." **Cooke, D.** Union of Concerned Scientists, September 2016.
3. "The trade-off between fuel economy and performance: Implications for the mid-term evaluation of the National Program." **Cooke, D.** Union of Concerned Scientists, February 2016.
2. "Fuel savings available in new heavy-duty trucks in 2025." Khan, S., **Cooke, D.**, and Tonachel, T. Paper presented at the 94th meeting of the Transportation Research Board, January 11-15, 2015, Washington, DC. TRB Paper 15-4977.
1. "Determining representative duty cycles for heavy-duty vehicles." **Cooke, D.** Union of Concerned Scientists, October 2014.

Fact Sheets (primary or sole authorship)

7. "Even with Low Gas Prices, Vehicle Standards Offer Consumers Big Savings." Union of Concerned Scientists, September 2016. Online at www.ucsusa.org/midtermreview.
6. "More Trucks and SUVs Make Standards More Important, Not Harder to Achieve." Union of Concerned Scientists, June 2016. Online at www.ucsusa.org/midtermreview.
5. "Innovation Wins: Driving Fuel Economy Gains with New Technologies." Union of Concerned Scientists, June 2016. Online at www.ucsusa.org/midtermreview.
4. "Fuel Economy and Emissions Standards for Cars and Trucks, Model Years 2017 to 2025." Union of Concerned Scientists, June 2016. Online at www.ucsusa.org/midtermreview.
3. "Newly proposed heavy-duty truck efficiency standards for 2018-2029." Union of Concerned Scientists, July 2015. Online at www.ucsusa.org/clean-vehicles/fuel-efficiency/proposed-truck-standards.
2. "Tomorrow's Clean Vehicles, Today." Union of Concerned Scientists, May 2015. Online at www.ucsusa.org/cleanvehiclestoday.
1. "Big Rigs, Big Oil Savings: Technologies to reduce heavy-duty vehicle fuel use and emissions." Union of Concerned Scientists, March 2014. Online at www.ucsusa.org/assets/documents/clean_vehicles/Truck-Technology-Factsheet.pdf.

Regulatory Comments

8. Comments concerning the Reconsideration of the Final Determination of the Mid-term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-duty Vehicles and the Appropriateness of Model Year 2021 Greenhouse Gas Emissions Standards, submitted on behalf of the Union of Concerned Scientists, October 5, 2017. EPA-HQ-OAR-2015-0827-9200.
7. Comments regarding an Alternative Method for Calculating Off-Cycle Credits Under the Light-Duty Vehicle Greenhouse Gas Emissions Program: Applications From BMW Group, Ford Motor Co., and Hyundai Motor Group. Joint comment submitted on behalf of the Union of Concerned Scientists, American Council for an Energy-Efficient Economy, and the Natural Resources Defense Council, July 19, 2017. EPA-HQ-OAR-2017-0189-0016.
6. Comment regarding the granting of petition for rulemaking submitted by the Alliance of Automobile Manufacturers and the Association of Global Automakers. Joint comment of the American Council for an Energy-Efficient Economy, Natural Resources Defense Council, Safe Climate Campaign, Sierra Club, and Union of Concerned Scientists, February 15, 2017. NHTSA-2016-0135-0002.
5. Comment regarding EPA's proposed determination on the appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the midterm evaluation, submitted on behalf of the Union of Concerned Scientists, December 30, 2016. EPA-HQ-OAR-2015-

0827-6209.

4. Comments regarding Off-Cycle Credits under the Light-duty Vehicle Greenhouse Gas Emissions Program: Application for Alternative Method of Calculation, BMW Group, Ford Motor Co., General Motors Corp., Volkswagen Group of America, submitted on behalf of the Union of Concerned Scientists, October 3, 2016. EPA-HQ-OAR-2016-0503-0008.
3. Comments Concerning the Draft Technical Assessment Report for the Mid-term Evaluation of Model Year 2022-2025 Light-duty Vehicle Greenhouse Gas Emissions and Fuel Economy Standards, submitted on behalf of the Union of Concerned Scientists, September 26, 2016. EPA-HQ-OAR-2015-0827-4016.
2. Comments regarding the EPA and NHTSA jointly proposed rule, Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles (Phase 2), submitted on behalf of the Union of Concerned Scientists, October 1, 2015. EPA-HQ-OAR-2014-0827-1329.
1. Comments regarding Alternative Methods for Calculating Off-cycle Credits under the Light-duty Greenhouse Gas Emissions Program: Mercedes-Benz Vehicles, submitted on behalf of the Union of Concerned Scientists, October 31, 2013. EPA-HQ-OAR-2013-0643-0010.

SCIENTIFIC (PHYSICS) PUBLICATIONS

11. "Fe spin reorientation across the metamagnetic transition in strained FeRh thin films," Bordel, C., Juraszek, J., **Cooke, David W.**, Mankovsky, S., Minár, J., Moyerman, S., Fullerton, E. E., and Hellman, F. *Physical Review Letters* **109**, 117201 (2012).
10. "Thermodynamic measurements of Fe-Rh alloys," **Cooke, David W.**, Bordel, C., Moyerman, S., Fullerton, E.E., and Hellman, F. *Physical Review Letters* **109**, 255901 (2012).
9. "Electronic structure changes across the metamagnetic transition in FeRh via hard X-ray photoemission," Gray, A. X., **Cooke, David W.**, Krüger, P., Bordel, C., Kaiser, A. M., Moyerman, S., Fullerton, E. E., Ueda, S., Yamashita, Y., Gloskovskii, A., Schneider, C. M., Drube, W., Kobayashi, K., Hellman, F., and Fadley, C. S. *Physical Review Letters* **108**, 257208 (2012).
8. "Heat transfer simulation and thermal measurements of microfabricated x-ray transparent heater stages," Baldasseroni, C., Queen, D. R., **Cooke, David W.**, Maize, K., Shakouri, A., and Hellman, F. *Review of Scientific Instruments* **82**, 093904 (2011).
7. "Electron-mediated ferromagnetism in CoO/ZnO multilayer," Lee, H.-J., Karel, J., **Cooke, David W.**, and Hellman, F. *Physical Review Letters* **110**, 087206 (2013).
6. "Calorimetry of epitaxial thin films," **Cooke, David W.**, Groves, J.R., Clemens, B.M., Hellman, F., Moyerman, S., and Fullerton, E.E. *Review of Scientific Instruments* **82**, 023908 (2011).
5. "Enhanced density of states in Fe/Cr multi-layers," **Cooke, David W.**, Queen, D.R., and Hellman, F. (in preparation).
4. "Resonant impurity scattering and electron-phonon scattering in the electrical resistivity of Cr thin films," Boekelheide, Z., **Cooke, David W.**, Helgren, E., and Hellman, F. *Physical Review B* **80**, 134426 (2009).
3. "The role of the spin-density wave and disorder in the density of states of sputtered Cr films," **Cooke, David W.**, Boekelheide, Z., Queen, D.R., and Hellman, F. *Journal of Applied Physics* **105**, 07C314 (2009).
2. "Thermodynamic measurement of submilligram bulk samples using a membrane-based 'calorimeter on a chip'," **Cooke, David W.**, Michel, K.J., and Hellman, F. *Review of Scientific Instruments* **79**, 053902 (2008).
1. "Application of calorimetry on a chip to high-pressure materials," Navrotsky, A., Dorogova, M., Hellman, F., **Cooke, David W.**, Zink, B.L., Leshar, C.E., Boerio-Goates, J., Woodfield., B.F., and Lang, B. *Proceedings of the National Academy of Sciences* **104**, 9187-9191 (2007).

NATIONAL ACADEMIES REPORTS

- The Resilience of the Electric Power Delivery System in Response to Terrorism and Natural Disasters (2013, rapporteur)
 - Transitions to Alternative Vehicles and Fuels (2013)
 - Assessment of Solid State Lighting (2013)
 - An Evaluation of the U.S. Department of Energy's Marine and Hydrokinetic Resource Assessments (2013)
-

PRESENTATIONS

Transportation

- "Getting to Zero Emissions: Heavy-duty Pathways to 2050," *Green Truck Summit, at the Work Truck Show*, Indianapolis, IN (March 14, 2017) (INVITED)
- "Why do fuel economy standards matter with cheap gas?" *96th Annual Meeting of the Transportation Research Board*, Washington, DC (January 10, 2017) (INVITED)
- "Vocational vehicles: How new regulations could affect this complex segment," *SAE Commercial Vehicle Engineering Congress*, Rosemont, IL (October 7, 2015) (INVITED)
- "Opportunities for reducing fuel usage from heavy-duty vehicles—EPA/NHTSA standards, phase 2," *SAE Government/Industry Meeting*, Washington, DC (January 22, 2015) (INVITED)

Physics

- "Calorimetry of epitaxial thin films," *American Physical Society – March Meeting 2011*, Dallas, TX (March 24, 2011)
 - "Examining the AF>FM transition in Fe-Rh thin films through specific heat, photoemission, and Mossbauer spectrometry measurements," *American Physical Society – March Meeting 2011*, Dallas, TX (March 23, 2011)
 - "Thermodynamic measurements of iron-rhodium alloys," *American Physical Society – March Meeting 2010*, Portland, OR (March 17, 2010).
 - "The role of the spin-density wave and disorder in the density of states of sputtered Cr films," *53rd Annual Conference on Magnetism and Magnetic Materials*, Austin, TX (November 13, 2008).
 - "Heat capacity measurements of Fe/Cr multi-layers," *American Physical Society – March Meeting 2008*, New Orleans, LA (March 13, 2008).
 - "Application of 'calorimetry-on-a-chip' technology to heat capacities of quenched high pressure samples," *COMPRES Calorimetry-on-a-Chip Workshop*, Berkeley, CA (March 15, 2007) (INVITED)
 - "Heat capacity measurements of sub-milligram quantities of mantle materials," *American Physical Society – March Meeting 2006*, Baltimore, MD (March 15, 2006).
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