

CSS Pathways: *Anticipating Impacts of Chemicals*

THE EPA CHEMICAL SAFETY RESEARCH UPDATE

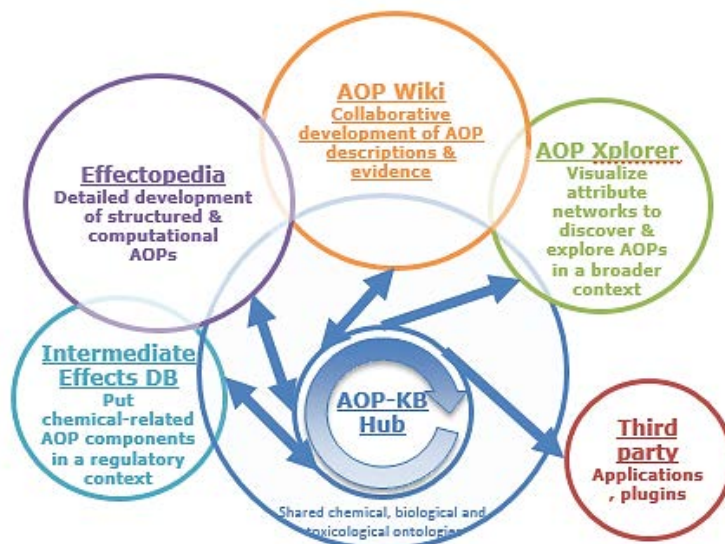
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CSS Highlights

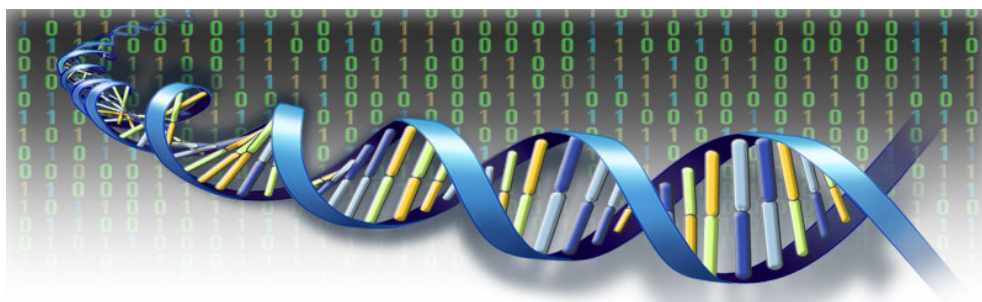
Adverse Outcome Pathway Wiki Open to the Public!

On September 25th, through a collaboration with the international scientific community, the European Joint Research Center, the US Army Corp of Engineers and the [Organization for Economic Cooperation and Development \(OECD\)](#), EPA publicly released the online [Adverse Outcome Pathway \(AOP\) Wiki](#)—an interactive, virtual encyclopedia for global AOP development and evaluation. An AOP is a conceptual framework that shows existing knowledge concerning the linkage between a chemical interacting with a biological process, a direct molecular initiating event, and an adverse human or environmental health risk. The wiki is the first publicly released module of the larger [AOP Knowledgebase \(AOP KB\)](#). This close international collaboration has resulted in the beginnings of a knowledgebase that will consolidate comprehensive knowledge on how chemicals can induce adverse effects. EPA's Adverse Outcome Pathway project team is hosting regular [webinars](#) to strengthen CSS AOP research efforts by facilitating communication and collaboration between CSS, Program Offices, and Regions.



A Successful EPA Chemical Safety Data Summit Held In Research Triangle Park, NC

EPA's Chemical Safety Data Summit: Exploring How to Use ToxCast Data held on September 29th and 30th was very successful at bringing together a wide range of stakeholders to discuss how to use massive amounts of new chemical safety data from high-throughput screening technologies to better inform chemical policy and regulatory decisions. Over 200 stakeholders participated in person and over 80 stakeholders tuned in remotely via webinar. Jim Jones, Assistant Administrator for EPA's Office of Chemical Safety and Pollution Prevention kicked off the Summit by presenting his vision for how EPA can use this data to prioritize the thousands of chemicals EPA is responsible for regulating. A diversity of presentations and posters were also presented by academia, industry, federal government, international government, and non-governmental groups. Examples of groups presenting at the Summit include Harvard University, DOW Chemical, Duke University, Health Canada, American Chemistry Council and Green Screen. Closing remarks were delivered by Robert Kavlock, EPA's Office of Research and Development Deputy Assistant Administrator for Science who said, the future is looking bright for EPA's ToxCast program. The local North Carolina Public Radio (UNC-NPR) station promoted the Summit during its Morning Edition segment and BNA wrote an article (see below) about how EPA foresees the use of these new tests in the endocrine program. A Greenwire reporter participated via webinar and a Chemical Engineering News reporter is writing an article for one of their November issues. Summit materials including presentations, poster abstracts and a recording of the Summit will be posted here: <https://sites.google.com/site/toxcastdatasummit/>.



Research Study of PFCs in Bald Eagle Nestlings in the Upper Midwestern United States

Due to their unique properties of repelling both water and oil, perfluorinated chemicals (PFCs) are useful in a variety of industrial and consumer products—cookware, firefighting foams, pesticides, etc.—and have been in production since the 1950s. PFCs are of concern due to their widespread history of use, persistence in the environment, propensity to bioaccumulate in animal tissues, and growing evidence of toxicity.

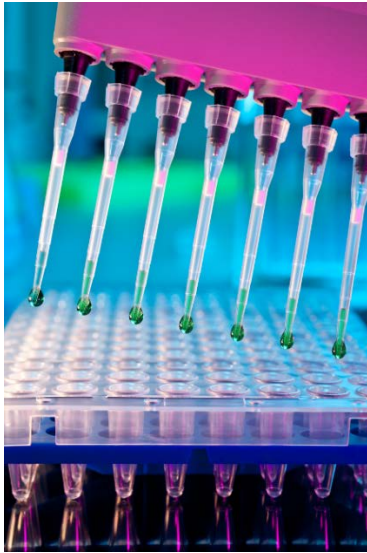


EPA scientists have collaborated with the U.S. National Park Service Great Lakes Inventory and Monitoring Network and the National Wildlife Health Center to produce a five-year study, published June 2014, assessing levels of 16 different PFCs in 261 bald eagle nestlings from the upper Midwest, United States. The objectives of this study were to evaluate the spatial patterns and temporal trends on 16 PFC compounds in the region and to suggest implications of exposure to humans and wildlife.

The bald eagle nestlings served as good indicators of local PFC contamination in the upper Midwest, showing that levels of all 16 PFCs, perfluorooctane sulfonate (PFOS), and perfluorodecane sulfonate (PFDS) —a long-chained PFC with the potential for high bioaccumulation and toxicity—were highest in more urban and industrial areas, moderate on Lake Superior, and low on the upper St. Croix River watershed. After a thorough review of the results, researchers recommend that PFDS should be considered for future animal and human toxicity and exposure studies.

The full published paper can be accessed and read [here](#).





Paper Reviews the Use of ToxCast Program Approaches for Chemical Safety Risk Assessments

In April, EPA scientists published a paper in *Basic & Clinical Pharmacology & Toxicology* entitled “In Vitro and Modeling Approaches to Risk Assessment from the U.S. Environmental Protection Agency ToxCast Program.” The review discusses Phase 1 of EPA’s Computational Toxicology ToxCast project, including: the chemical and assay selection process, chemical testing, model building and reverse toxicokinetics. The paper also gives examples of where ToxCast, combined with ExpoCast, can be used to develop higher throughput risk based evaluations. To read more about this article, click [here](#).



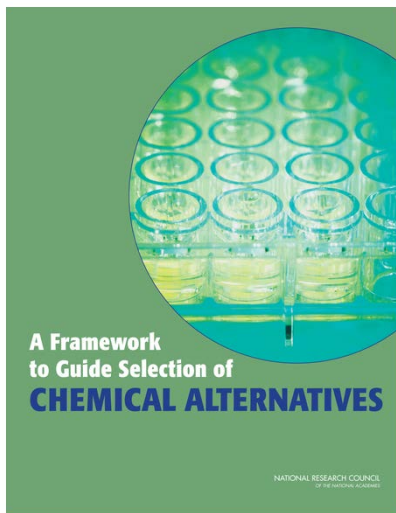
Publication on Risks of Pharmaceuticals to Wildlife and Ecosystems Just Released

Two articles co-authored by EPA scientists have been featured in The Royal Society's *Philosophical Transactions of Biological Sciences* journal as part of their special theme issue on "Assessing risks and impacts of pharmaceuticals in the environment on wildlife and ecosystems." The issue highlights some of the latest research on pharmaceuticals in the environment and serves to inform scientific and policy concerns regarding their environmental impacts. Access to the articles below and the rest of the issue is available online through the publisher's [website](#).

- "Medicating the environment: assessing risks of pharmaceuticals to wildlife and ecosystems"
- "Leveraging existing chemical data for prioritization of the ecological risks of human and veterinary pharmaceuticals to aquatic organisms"



National Research Council Releases Framework to Guide Selection of Chemical Alternatives:



At the request of the EPA, the National Research Council (NRC) released [A Framework to Guide the Selection of Chemical Alternatives](#) report on October 10, 2014. EPA asked NRC to form a diverse scientific committee to recommend a decision framework for industry and government to use to evaluate potentially safer substitute chemicals. This framework includes several important unique elements or advancements, such as:

- An increased emphasis on comparative exposure assessment
- Increased use of physicochemical properties to assess human health and ecotoxicity hazards
- A two-tiered approach to evaluating chemical alternatives that includes health and ecotoxicity, followed by a consideration of broader impacts
- Recognition of the need for research and innovation



EPA Honors Winners of the 19th Annual Presidential Green Chemistry Challenge Awards: Winning Technologies Tackle Climate Change and Promote Energy Efficiency

EPA recognized landmark green chemistry technologies developed by industrial pioneers and leading scientists that turn climate risk into business opportunities, spurring innovation and economic development. These technologies contribute to the use of chemicals and products that are safer for people's health and the environment. They are helping to solve some of our most pressing environmental problems, including climate change, water availability and pollution, and hazardous waste while improving the bottom line for America's manufacturing sector. This year's promising innovations include:

- Developing renewable fuel that may create 82% less GHGs than petroleum diesel
- Making life-like-color LED TVs using 40k gal less toxics per year
- Creating a better firefighting foam without toxic chemicals
- Using oxygen instead of hazardous chemicals in key step to produce pharmaceuticals
- Making vegetable oil from microalgae to replace petroleum in industrial chemicals

For the listing of winners, please read the [EPA news release](#).



Upcoming & Recent Events

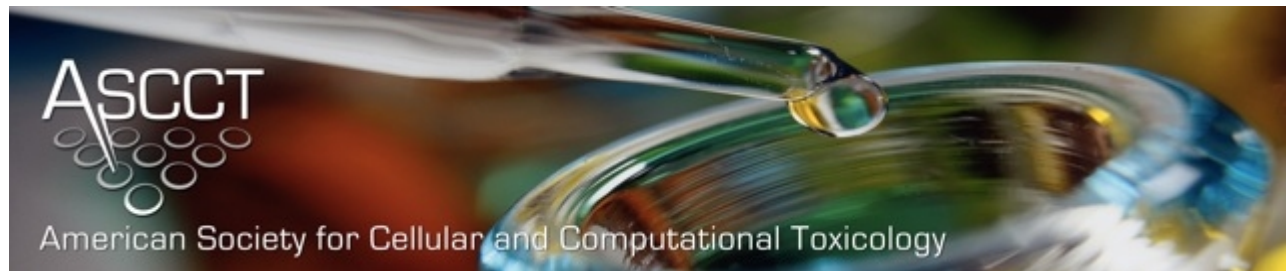
EPA's Computational Toxicology Communities of Practice (CoP) Webinar

Please join us on **November 20th** for next month's Computational Toxicology Communities of Practice. This particular seminar is being held a week earlier than the usual 4th Thursday of the month due to the federal holiday. John Wambaugh from EPA's National Center for Computational Toxicology will give a presentation about the progress of EPA's high-throughput exposure prediction research project. For more information on this or other presentations, please visit the [Communities of Practice webpage](#).



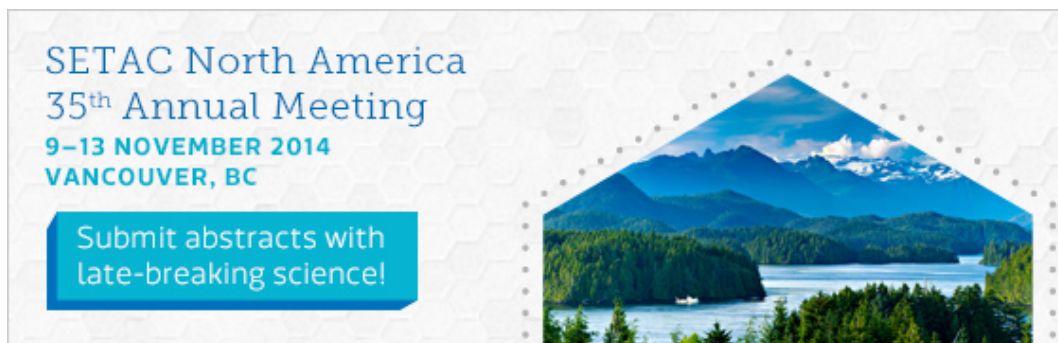
3rd Annual American Society for Cellular and Computational Toxicology Meeting

The American Society for Cellular and Computational Toxicology is hosting its 3rd Annual meeting: "Where Chemistry and Biology Meet: AOPs as a Framework for Advancing Toxicology", on **November 12, 2014**, at the Lister Hill Auditorium at NIH. AOPs theme will be explored from three different perspectives and feature talks by Robert Kavlock of EPA, Jennie Larkin and Ajay Pillai from NIH, and Mark Cronin from Liverpool John Moores University as well as a panel discussion. A few submitted abstracts will be selected for oral presentations. The afternoon will include presentations from the Japanese Society for Alternatives to Animal Experiments and the Center for Alternatives to Animal Testing. Please visit www.ascctox.org for more information and a link to the registration page.



EPA Research at Society of Environmental Toxicology and Chemistry Meeting

EPA will participate in the upcoming SETAC North American Annual Meeting on **November 9-13, 2014** in Vancouver, BC, Canada. EPA staff will make presentations featuring Adverse Outcome Pathways research, models to predict effects of chemicals on the environment and how EPA is using strategic stakeholder outreach to encourage the use of chemical data resulting from high-throughput screening technologies. EPA is also sponsoring a booth which will feature live demonstrations of tools that can be used to help predict ecological risks of chemicals. EPA staff will be available at the booth to meet with SETAC participants.



Grantees Corner

EPA Awards STAR Grants for new methods for *Exposure Science in the 21st Century Project*



Through the Science to Achieve Results grant program, EPA has awarded \$4.5 million to five universities to conduct innovative research to advance methods for characterizing real-world human exposure to chemicals associated with consumer products in indoor environments. EPA received a total of 33 grant proposals and is awarding research funding to: Develop and/or apply innovative technologies and methods to characterize the presence and co-occurrence of suites of semivolatile chemicals (dozens to hundreds) in real-world indoor environments associated with the emissions from and use of consumer products; Generate data to advance the scientific basis of exposure predictions by providing values for key model parameters, building confidence in model assumptions, and confirming model predictions for relevant pathways; and Develop and/or apply innovative technologies and methods to profile chemicals and related metabolites associated with consumer products in biological media. This funding has been awarded to: University of California, Davis; Duke University; University of California, San Francisco; University of Michigan; and Virginia Polytechnic Institute and State University.



EPA Funding Research on Susceptibility and Variability in Human Response to Chemical Exposure

The Susceptibility and Variability in Human Response to Chemical Exposure [STAR grant](#) provides funding to study life stage and/or genetic susceptibility in order to better characterize the sources of human variability in response to chemical exposures. Drs. Ivan Rusyn and Fred A. Wright from Texas A&M University and North Carolina State University have been awarded \$800,000 to pursue their research on the toxicogenetics of tetrachloroethylene (TCE), a chemical regulated by EPA for potential human health risks. The three-year study will evaluate how differences in human genetic makeup may affect the way TCE is metabolized and its target organs of toxicity using mice as an animal model.

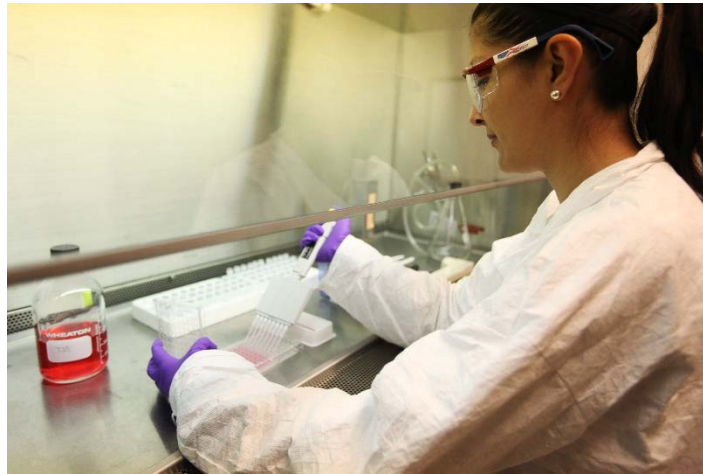


Employment Opportunities

Post-Doctoral Research Program

In FY 1998, ORD began to enhance its scientific workforce by attracting first rate postdoctoral scientists and engineers into its research program through this new hiring initiative. Over 300 postdoctoral researchers have participated in the program to date. The program offers appointments of up to four years, state-of-the-art facilities, world-class scientific expertise, locations throughout the United States, travel to professional scientific meetings, and active postdoctoral trainee organizations. Participants receive full benefits and a salary commensurate with qualifications and locality pay adjustments.

For a current listing of EPA postdoctoral positions, please visit this [webpage](#).





Recent News Articles

- [U.S., European Agencies Publicly Releasing Adverse Outcome Pathway Wiki in September—BNA](#)
- [International Nano Scientists Converge at USC, Talk Future Effects—ChemicalWatch](#)
- [Academies to Advise DOD on Emerging Toxicity Tests, Protecting Soldiers in Combat—BNA](#)
- [EPA Foresees Use of Four Robotic Tests in Endocrine Program—BNA](#)
- [Canada Building on Progress with the CMP—ChemicalWatch](#)



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