

# CSS Research News and Highlights

## CSS Highlights

### **EPA Paper Published in Nature Biotechnology: *Phenotypic screening of the ToxCast chemical library to classify toxic and therapeutic mechanisms***

EPA scientists recently published a paper on high throughput toxicology research in [Nature Biotechnology](#) that showcased how ToxCast might be used to predict the potential toxicity of chemicals. EPA researchers analyzed the screening results generated by one of its assay technologies, BioSeek, and compared the results to known chemical information to determine if this new technology can be used to predict the potential toxicity and therapeutic effect of 776 chemicals found in pharmaceuticals, pesticides, and other commonly used consumer products.

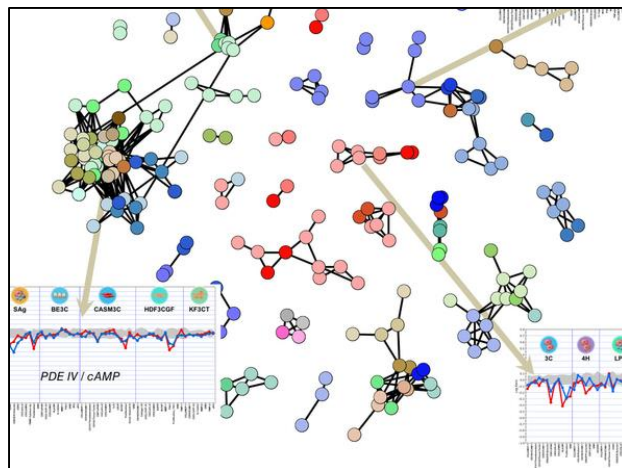


Figure segment from Kleinstreuer, et al. 2014

The paper describes the analysis of all screening results and then compares them to animal toxicity studies and other established toxicity information, demonstrating that these new technologies can be used to predict potential health hazards. The authors also explain that the screening results provide information on how the chemicals interact with exposed cells and which important biological processes may be impacted.

The paper is available on the [publisher's website](#).

Visit the ToxCast website to learn more about the EPA [ToxCast program](#).



## EPA Paper Awarded “Top Five Best Papers” in SETAC Journal 2013

EPA researcher Carlie LaLone’s paper titled, [Cross species sensitivity to a novel androgen receptor agonist of potential environmental concern, spironolactone](#) has been awarded “Best Paper Award Finalist” by the Society of Environmental Toxicology and Chemistry (SETAC) for 2013. This paper was among 5 nominated articles for “Best Paper Award.” *Environmental Toxicology and Chemistry (ET&C)* will be publishing a list of the top 5 articles as well as a piece on the winner of the “Best Paper Award” in the July 2014 issue. The paper studied the effects of spironolactone, a pharmaceutical drug that affects the androgen receptor, on vertebrates and invertebrates. More importantly this paper demonstrates how prior knowledge of adverse outcome pathways (AOPs) and the conservation of a key molecular target across vertebrates can be utilized to identify potential chemicals of concern for monitoring and highlight potentially sensitive species and endpoints for testing. This paper presents one of several CSS studies evaluating the applications of AOPs to transform and enable predictivity in chemical safety evaluations.

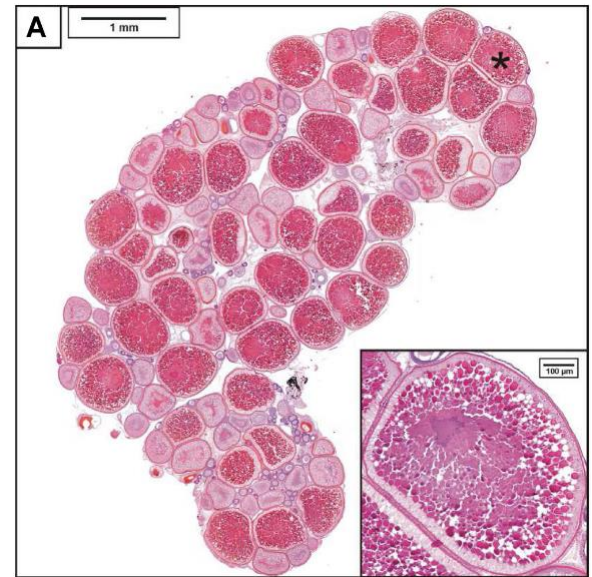
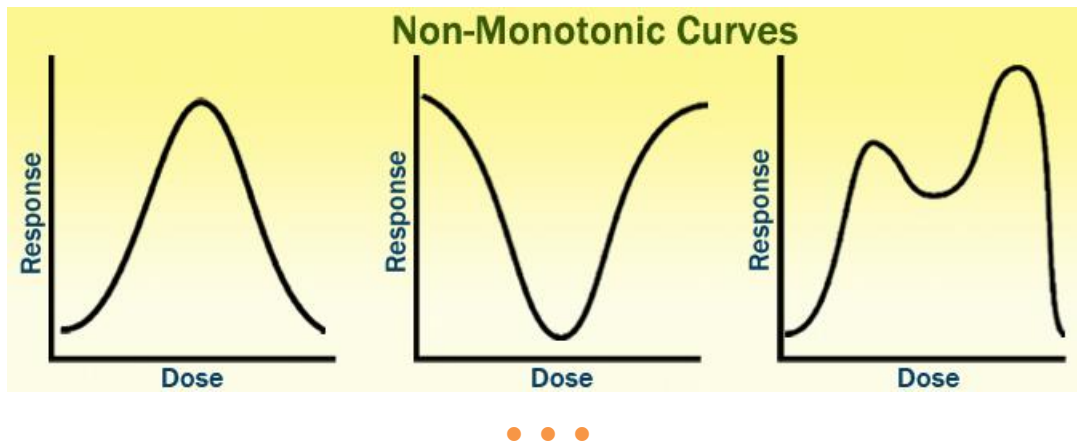


Figure from LaLone, et al. 2013



## Non-Monotonic Dose Response Curve (NMDRC)

The National Academy of Sciences released their [review of EPA's State-of-the-Science Evaluation of Nonmonotonic Dose-Response Relationships as They Apply to Endocrine Disruptors](#). This report is the Agency's first step towards an evaluation of the state of the science and informed understanding of NMDRs and their implications to chemical testing strategies. EPA is currently reviewing the NAS recommendations and will determine the next steps for addressing their findings and recommendations. There is more information available on EPA's [NMDRC report webpage](#).



# CSS Program in Review

## Joint Science Advisory Board (SAB) and Board of Scientific Counselors (BOSC) Meeting – July 24-25

The SAB and BOSC met July 24-25 to evaluate preliminary outlines of EPA’s Office of Research and Development’s (ORD) FY16-19 Strategic Research Action Plans (StRAPs) for the National Research Programs (NRPs). The six research programs ([ACE](#), [CSS](#), [SSWR](#), [HHRA](#), [HS](#), and [SHC](#)) provided overviews of their strategic direction, soliciting feedback from the SAB and BOSC advisory members.

In addition, the advisory members provided feedback on four ORD cross-cutting research roadmaps which include: the [Children’s Environmental Health Roadmap](#) led by Elaine Cohen Hubal of CSS, Global Climate Change led by Andy Miller of ACE, Nitrogen and Co-pollutants led by Anna Rea of SSWR, and Environmental Justice led by Mary Manibusan of OSP.

This meeting provided the opportunity to solicit early input on each NRP’s strategic direction and seek feedback on the strength of cross-program integration either explicitly through the cross-cutting roadmaps, or through coordinated research activities. Plenary and breakout group discussions provided rich feedback to the National Program Directors, who will begin to address these as they evolve the StRAPs and roadmaps in FY 14-15.



## FIFRA Scientific Advisory Panel Meeting – July 29-30



The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel (SAP) met July 29-30, 2014 to hear presentations from EPA researchers about using high-throughput exposure estimates to prioritize chemicals for potential endocrine disruption. The SAP was convened by EPA's Endocrine Disruption Screening Program (EDSP). EPA's EDSP is charged with determining whether chemicals disrupt estrogen (direct female reproduction and development), androgen (direct male reproduction and development) and thyroid hormones (important to brain development). EDSP is interested in using high-throughput exposure estimates from EPA's Chemical Safety for

Sustainability Research Program to inform prioritization of the thousands of chemicals of interest for testing. To ensure these results are scientifically sound and relevant the SAP was asked to provide recommendations to EPA about using these new approaches. The SAP's initial comments were positive and supportive, and their report with specific evaluations and comments will be issued in approximately 90 days. More information is available at: <http://www.epa.gov/scipoly/sap/meetings/2014/072914meeting.html>



## Upcoming Events & Meeting Announcements

### ToxCast Data Summit – September 29-30 at EPA in Research Triangle Park, NC

Do you have ideas of how the ToxCast high-throughput screening data can be used? We want YOU to submit your ideas in an abstract for this event! It is not necessary to have any detailed or published work in order to attend. This Data Summit encourages discussion, collaboration, and feedback about the ideas presented, and also on EPA's work with the Data and iCSS Dashboard. Abstracts are due August 1. Please see the Data Summit [website](#) for more information.



## EPA @ Upcoming International Society of Exposure Science (ISES) Meeting

The EPA will be participating in the 24th Annual International Society of Exposure Science (ISES) Meeting coming up on October 12-16, 2014 in Cincinnati, Ohio. The theme for this year is *Exposure Science Integration to Protect Ecological Systems, Human Well-Being, and Occupational Health*, with the Agency's own Dr. Tim Buckley and Dr. Lisa Jo Melnyk serving as meeting chairs.

Additionally, Dr. Buckley will be co-chairing and speaking at one of the symposia on the development of predictive models from big data. EPA scientist Dr. Kristin Isaacs will also co-chair a session titled, "The ExpoDat Initiative: Exposure-Informed Chemical Safety Assessment for High Throughput Prioritization," during which she will present on the Stochastic Human Exposure and Dose Simulation High Throughput (SHEDS-HT) Model, alongside Dr. John Wambaugh, who will discuss the use of EPA's [ExpoCast](#) Framework for rapid exposure forecasts.

Conference attendees can also check out the Agency exhibit booth and some of the pre-conference workshops instructed by EPA staff. To learn more, visit the meeting website at: <http://www.ises2014.org/>.



## EPA Scientists to Present at 9th World Congress on Alternatives and Animal Use in the Life Sciences Meeting – August 24-28 in Prague, Czech Republic



Dr. Bob Kavlock, Deputy Assistant Administrator for Science of the Office of Research and Development, is a Keynote Speaker at the 2014 [WC9 meeting](#). He will be discussing the US [Toxicology in the 21<sup>st</sup> Century \(Tox21\)](#) Program, a federal collaboration between EPA, NIEHS/NTP, NCATS, and FDA. Several EPA scientists are leading the organization of sessions at the Congress and will present transformative applications of EPA research on alternatives and animal use in life science research. These include: Dr. Thomas Knudsen on virtual tissue models, Dr. Bill Mundy on high-content imaging, Dr. Richard Judson on predictive biology, Dr. Keith Houck on nanomaterials risk assessment, Dr. Ann Richard on computational modeling and chem-informatics, and Dr. John Wambaugh on exposure. Dr. David Dix will also be chairing two sessions on Endocrine Disruption and Chemical Regulation. Please visit the [meeting agenda](#) for additional presentations by EPA experts and more detailed information.



## AOP Scientific Workshop – September 3-5, 2014

The National Toxicology Program (NTP) and Physicians Committee for Responsible Medicine (PCRM) are hosting a public scientific workshop, *Adverse Outcome Pathways: From Research to Regulation*, on September 3-5, 2014 in Bethesda, MD. The workshop will feature a diverse group of speakers from government, academia and industry, including EPA staff

Stephen Edwards, David Dix, Dan Villeneuve, John Wambaugh, Shannon Bell, Rita Shoeny and Robert Devlin. For more information on the workshop, visit: <http://ntp.niehs.nih.gov/go/41374>.





## Previous Events & Meetings

### EPA Hosts Networks for Characterizing Chemical Life Cycle (NCCLC) and Networks for Sustainable Molecular Design and Synthesis (NSMDS) Grantees Kick-Off Meeting

On June 23-24, 2014, EPA hosted a kick-off meeting for grants recently awarded to academic institutions to form two research networks: the Networks for Characterizing Chemical Life Cycle (NCCLC) and the Networks for Sustainable Molecular Design and Synthesis (NSMDS). These grants were funded through a joint collaboration between EPA and the National Science Foundation. During the meeting, lead researchers from both Networks presented their project plans, and EPA lead researchers presented their ongoing research in these areas. The NCCLC grant recipients include University of California, Santa Barbara and Arizona State University. For more information on these grants, visit the [NCER webpage](#). The NSMD grant recipients include Yale University, University of Kansas, University of Arizona, and Colorado State University. For more information on these grants, visit the [NSF website](#).



## Green Chemistry & Engineering Conference



EPA had a large presence at the American Chemical Society (ACS) Green Chemistry Institute's *18th Annual Green Chemistry and Engineering Conference* on June 17-19, 2014. CSS National Program Director (NPD) Dr. Tina Bahadori served as one of the co-chairs on the conference organizing committee, along with Deputy NPD Dr. Elaine Cohen Hubal who chaired one of the Chemical

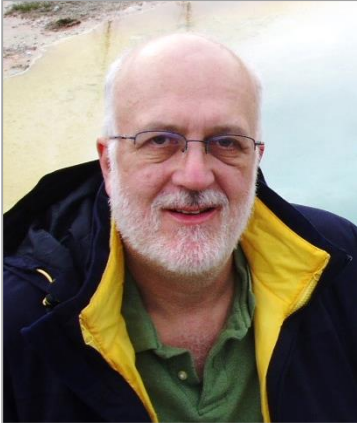
Design sessions, titled "Knowledge and Tools to Evaluate Alternatives." Several EPA scientists also presented over the three-day conference, including Dr. Paul Harten, who promoted EPA's Program for Assisting the Replacement of Industrial Solvents ([PARIS III](#)) software tool, and Keith Houck, who spoke about ToxCast in the workshop on "Making Tools for Safer Chemical Design Work for You."

Be sure to check out conference video presentations, including a video of Dr. Harten explaining PARIS III on the ACS Green Chemistry Institute YouTube Channel:

[https://www.youtube.com/playlist?list=PLIMW6nMYOanSaqvidWj\\_CDs7taatrjhr](https://www.youtube.com/playlist?list=PLIMW6nMYOanSaqvidWj_CDs7taatrjhr)



## International OECD meeting for Validating Testing Standards for Engineered Nanoparticles



Dr. William K. Boyes participated in the Organization for Economic Cooperative Development ([OECD](#)) Working Party on Manufactured Nanoparticles June 4-5 meeting. At the meeting, two sub-committees: the Steering Group on Testing and Assessment of Manufactured Nanomaterials (SG-TA) and the Steering Group on Risk Assessment and Regulatory Programs (SG-AP) met to discuss approaches for validating testing standards for engineered nanomaterials. The SG-TA is developing several relevant test guidelines for ENMs including: Inhalation Test Guidelines and Guidance to Accommodate Nanomaterials, Aquatic and Sediment Toxicology Testing of nanomaterials, Dissolution Rate of Nanomaterials in the Aquatic Environment, Test Guidance for Nanomaterials Removal from Wastewater, Dispersion and Dissolution of Nanomaterials in Aquatic Media – Decision tree, Assessing the Apparent Accumulation Potential of Nanomaterials, and Dispersibility and Dispersion Behavior of Nanomaterials in Aquatic Media. Several international partnerships were discussed including NanoReg, a common European approach to regulatory testing; a Canada-US Regulatory Cooperation Council; and a Business and Industry Advisory Committee (BIAC) to the OECD. Stay Current on EPA’s Nanomaterials Research – visit the [nanomaterials research webpage](#).



# Funding & Employment Opportunities

## EPA is Accepting Applications for ORISE Postdoctoral Positions

As part of the Oak Ridge Institute for Science and Education (ORISE) Internship/Research Positions Program, EPA is accepting applications for a number of Chemical Safety for Sustainability (CSS) centric positions across several EPA labs and centers including: the National Health Effects Research Lab (NHEERL), the National Exposure Research Lab (NERL), the National Center for Environmental Assessment (NCEA), the National Risk Management Research Lab (NRMRL), and the National Center for Computational Toxicology (NCCT). Some postdoctoral positions from the various labs and centers are listed below, but there are many more on the ORISE [Current EPA Research Opportunities](#) page.

- [Sustainable Synthesis and Applications of Nanomaterials and Nanocomposites](#)
- [Application of Computational Chemistry to Predictive Toxicity Modeling](#)
- [Chemical Safety for Sustainability](#)
- [Human Behavioral Exposure](#)
- [Applying Novel Data Streams to Advance Human Health Risk Assessment](#)



# Chemical Safety Research in the News



## Recent News Articles

- [EPA Advisers Endorse Agency's Draft Plans to Research Air, Chemicals and Other Topics](#)
- [EPA Strategies to Promote Rapid Analysis of Toxicity, Life Cycle Impacts to Be Critiqued](#)



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