Jeremy A. MacMahon, Ph.D

Scientist

Professional Profile

Fields of Expertise

Neurotoxicology, human health risk assessment; exposure assessment and reconstruction; occupational and environmental toxicology; forensic toxicology; inhalation toxicology and air quality; chemical hazard and weight-of-evidence evaluation; product safety and regulatory toxicology; extractables and leachables; food-contact materials; PFAS; environmental sampling and exposure characterization; and science communication

Education/Certifications

Ph.D., University of California: Davis, 2024, Pharmacology and Toxicology. Dissertation: *Evaluating soluble epoxide hydrolase as a neuroprotective therapeutic target for mitigating adverse neurological sequelae associated with acute diisopropylfluorophosphate intoxication.*

B.S., University of California: Davis, 2019, Biochemistry and Molecular Biology. Honors Thesis: *Maternal immune activation causes aberrant behaviors in offspring that are sex-specific and dictated by the baseline immune response before pregnancy.*

Current and Previous Positions

Staff Scientist, Intertox, Inc., Seattle, WA (2024-present).

Graduate Student Researcher, University of California: Davis, Davis, CA (2019-2024).

Selected Project Experience

Environmental and occupational toxicology projects involving landfill and wastewater odors; hydrogen sulfide exposure; aircraft cabin air quality; jet fuel, hydraulic fluids, solvents, and aviation-maintenance chemicals; occupational cancer causation; pharmaceutical extractables and leachables; PFAS in consumer products and food-contact materials; drinking-water chemistry and building plumbing investigations; chloroprene risk assessment; and forensic toxicology.

- Conducted physiologically-based pharmacokinetic modeling of ethanol, cannabis, and lead metabolism and intoxication in support of litigation.
- Conducted toxicological assessments of human exposure to chemicals present in or off-gassed from airline uniform garments in the context of numerous

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workers' compensation claims. Routes of exposure assessed were dermal and inhalation.

- Developed large scale database management system, data visualization software, and modeling software.
- Conducted toxicological assessments of human exposure to mold due to environmental exposure in the context of a workers' compensation claim.
- Conducted field experiments and data-based investigations of odor emissions from landfill and/or wastewater treatment plants.
- Conducted field experiments and analysis of drinking water chemistry for residential buildings.
- Developed sampling plan and analytical strategy for testing PFAS in consumer products, food packaging, and wearable materials.

Professional Memberships

- Society of Toxicology (2021-present)
- American Epilepsy Society (2022-present)

Peer Review and Editorial Service

Peer Reviewer: Journal of Applied Forensic Toxicology, Journal of Toxicological Sciences

Publications

MacMahon JA, Andrew PM, Izadi A, Bruun DA, Saito NH, Tancredi DJ, Brooks-Kayal A, Lein PJ, Gurkoff GG. Acute and persistent changes in neural oscillatory activity predict development of epilepsy following acute organophosphate intoxication in adult rats. *Epilepsia*. 2025;66(4):1329-1342. doi:10.1111/epi.18212.

MacMahon JA, Blackmon TJ, Bernardino PN, Hogans RE, Cheng MY, Vu J, Lee RD, Saito NH, Grodzki AC, Bruun DA, Wulff H, Woolard KD, Brooks-Kayal A, Harvey DJ, Gorin FA, Lein PJ. Spatiotemporal perturbations of the plasminogen activation system in a rat model of acute organophosphate intoxication. *Acta Neuropathol Commun*. 2025;13:62. doi:10.1186/s40478-025-01979-0.

Andrew P.M., **MacMahon J.A.**, Bernardino P.N., Tsai Y.H, Hobson B.A., Porter V.A., Huddleston S.L., Luo A.S., Bruun D.A., Saito N.H., Harvey D.J. Brooks-Kayal A., Chaudhari A.J., Lein P.J. (2024). Shifts in the spatiotemporal profile of inflammatory phenotypes of innate immune cells in the rat brain following acute intoxication with the organophosphate diisopropylfluorophosphate. *J Neuroinflammation* 21, 285.

Andrew P.M., Feng W., Calsbeek J.J., Antrobus S.P., Cherednychenko G.A., **MacMahon J.A.,** Bernardino P.N., Liu X., Harvey D.J., Lein P.J., Pessah I.N. (2024). The a4 nicotinic acetylcholine receptor is necessary for the initiation of organophosphate-induced neuronal hyperexcitability. *Toxics*. 12:263.

Bernardino P., Hobson B., Huddleston S., Andrew P., **MacMahon J.A.**, Saito N., Porter V., Bruun D., Harvey D., Garbow J., Gelli A., Chaudhari A., Lein P.J. (2023). Time- and

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region-dependent blood-brain barrier impairment in a rat model of organophosphate-induced status epilepticus. *Neurobiology of Disease*, 187:106316.

Calsbeek J.J., González E. A., Bruun D.A., Guignet M. A., Copping N., Dawson M.E., Yu A.J., **MacMahon J.A.**, Saito N. H., Harvey D. J., Silverman J. L., Lein P. J. (2021). Persistent neuropathology and behavioral deficits in a mouse model of status epilepticus induced by acute intoxication with diisopropylfluorophosphate. *NeuroToxicology*, 87, 106–119.

MacMahon J.A., Estes M L., Prendergast K., Cameron S., Aboubechara J.P., Farrelly K., Sell G. L., Haapanen L., Schauer J. D., Horta A., Shaffer I. C., Le C. T., Kincheloe G. N. Tan D. J., Van der List D., Bauman M. D., Carter C. S., Van de Water J., McAllister A. K. (2020). Baseline immunoreactivity before pregnancy and poly(i:c) dose combine to dictate susceptibility and resilience of offspring to maternal immune activation. *Brain, Behavior, and Immunity*, 88, 619–630.

Non-Refereed Publications

MacMahon, J.A., Unkel, C., Lein, P.J. (2023). Out of the frying pan and into the fire: The gas stove toxicity debate. Open Access Government, eBooks. https://www.openaccessgovernment.org/article/gas-stove-toxicity-debate-fire-air-pollution/156242/.

MacMahon, J.A., Bruun, D., Lein, P.J. (2023). Military burn pits: A toxic legacy of war. Open Access Government, eBooks. https://www.openaccessgovernment.org/military-burn-pits-a-toxic-legacy-of-war-verteran-health-conflict/149605/.

MacMahon J.A., Tsai Y.H., Lein P.J. (2022). Shellfish poisoning: A neurotoxic consequence of global warming. Open Access Government, eBooks. https://www.openaccessgovernment.org/shellfish-poisoning-a-neurotoxic-consequence-of-global-warming/137689/.

MacMahon J.A., Matelski L., Lein P.J. (2022). Covid-19 vaccines: Risks versus benefits. Open Access Government, eBooks. https://www.openaccessgovernment.org/the-covid-19-vaccines-risks-versus-benefits/119767/.

MacMahon J.A., Matelski L., Mundy P., Gorin F.A., Lein P.J. (2021). Tailoring the immune system to viral threats. Open Access Government, eBooks. https://www.openaccessgovernment.org/vaccines-viral-threats/116109/.

MacMahon J.A., Calsbeek J.J., Lein P.J. (2020) Beyond Skin Deep: The Emerging Science of TattooToxicology. Open Access Government, eBooks. https://www.openaccessgovernment.org/organophosphate-chemical-threat-agents/87223/.

Selected Presentations

2024. **MacMahon J.A.**, Andrew P., Bernardino P., Lein P.J. Evaluating soluble epoxide hydrolase as a neuroprotective therapeutic target for mitigating adverse neurological sequelae associated with acute diisopropylfluorophosphate intoxication. Annual Society of Toxicology Meeting in Salt Lake City, Utah, USA. March 2024.

2023. Bernardino P., **MacMahon J.A.**, Andrew P., Lein P.J. Blood-brain barrier impairment is seizure-dependent in a male rat model of acute organophosphate

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intoxication. Poster presented at the 16th Annual CounterACT Network Research Symposium in Bethesda, Maryland, USA. August 2023.

2023. Andrew P., **MacMahon J.A.**, Bernardino P., Lein P.J. Functional phenotyping of microglia and astrocytes in rats acutely intoxicated with diisopropyl-fluorophosphate (DFP). 16th Annual CounterACT Network Research Symposium in Bethesda, Maryland, USA. August 2023.

2023. **MacMahon J.A.**, Blackmon T., Bruun D., Bernardino P., Hogans R., Harvey D., Saito N., Gorin F.A., Lein P.J. Acute exposure to diisopropylfluorophosphate (DFP) perturbs the plasminogen activation system (PAS) within the plasma and brain of male rats. Annual Society of Toxicology Meeting in Nashville, Tennessee, USA. March 2023.

2023. **MacMahon J.A.** Evaluating soluble epoxide hydrolase as a neuroprotective therapeutic target for mitigating adverse neurological sequelae associated with acute diisopropylfluorophosphate intoxication. Benzodiazepines: Seizures and Improving Long-term Outcomes – NIH CounterACT program Workshop, University of California, Davis, Davis, CA (online meeting only). February 2023.

2022. **MacMahon J.A.**, Andrew P., Bruun D.A., Bernardino P., Hammock B.D., Lein P.J. Soluble epoxide hydrolase as a therapeutic target for mitigating organophosphate-induced neuroinflammation and acquired epilepsy in a rat model of acute diisopropylfluorophosphate (DFP) intoxication. American Epilepsy Society in Nashville, Tennessee, USA. December 2022.

2022. **MacMahon J.A.** Soluble epoxide hydrolase as a therapeutic target for mitigating organophosphate-induced neuroinflammation and acquired epilepsy in a rat model of acute diisopropylfluorophosphate (DFP) intoxication. Toxicology mentoring and skills development training program workshop, University of California, Davis, Davis, CA. October 2022.

2022. **MacMahon J.A.** Investigating soluble epoxide hydrolase as a therapeutic target for mitigating the chronic neurotoxicity of acute diisopropylfluorophosphate (DFP) intoxication. 15th annual CounterACT Research Symposium, Higgins Hotel, New Orleans, LA. March 2022.

2022. Bernardino P., Hobson B., Baker S., Andrew P., **MacMahon J.A**., Bruun D., Chaudhari A., Lein P.J. Magnetic resonance imaging (MRI)-evidence of blood-brain barrier (BBB) disruption in a rat model of organophosphate intoxication. 15th Annual CounterACT Research Symposium in New Orleans, Louisiana, USA. March 2022.

2022. Liu X., Calsbeek J.J., Gonzalez E., Nguyen A., **MacMahon J.A**., Andrew P., Lein P.J. Role of cholinergic nicotinic receptor in status epilepticus caused by acute diisopropylfluorophosphate (DFP) intoxication in adult mice. Annual Society of Toxicology Meeting in San Diego, California, USA. March 2022.

2019. **MacMahon J.A.,** Prendergast K., Estes M., Farrelly K., Cameron S., Aboubechara J.P., Horta A., Kincheloe G., Haapanen L., Van Der List D., Bauman M.D., Carter C., Van De Water J., McAllister A.K. Behavioral phenotypes in maternal immune activation are influenced by baseline immune response and sex. Annual Undergraduate Research Conference, Davis, California, USA. April 2019.

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