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## Beatrice Hernout

Senior Scientist | Ecological and Biological Sciences

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### Professional Profile

Dr. Hernout specializes in wildlife toxicology, with a focus on understanding how chemical stressors impact wild populations. She has experience assessing the exposure and bioaccumulation of chemicals in wildlife and evaluating potential adverse effects and predicting risks.

Dr. Hernout's research has drawn upon her expertise using techniques from molecular toxicology (e.g., Western blotting, EROD assays, and GST assays), spatial analysis, analytical chemistry (i.e., ICP-MS and GC-MS), ecological monitoring, and computational biology.

Her doctoral studies focused on assessing the risks of soil-associated metals to bats in England and Wales by developing and applying a spatially explicit modeling framework. She also extended the model to assess exposure to several bat and passerine bird species, and validated model results against a targeted monitoring dataset of metal concentrations in bat tissues. Further, to refine estimations of the amount of chemicals readily accessible in the blood stream through the digestive tract, Dr. Hernout developed an *In vitro* gastric model to assess the bioaccessibility of metals to insectivorous bats.

Dr. Hernout's post-doctoral research focused on the effects of organic chemicals on marine organisms. She investigated the effects of crude oil, dispersant, and their mixture, on enzymes involved in endocrine function and detoxification processes in the loggerhead sea turtle (*Caretta caretta*). Her research also investigated metabolic disruptions (e.g., Tricarboxylic acid (TCA) cycle activity) induced by hypoxia in zebrafish (*Danio rerio*) using a genome-scale metabolic model. She has also studied the association between organic compounds (e.g., PCBs and PAHs) and biochemical biomarkers of pollution in fish from the Gulf of Mexico.

### Academic Credentials & Professional Honors

Ph.D., Environmental Science, University of York, UK, 2014

M.S., Ecology and Ethology, Université Jean Monnet, France, 2008

B.S., Environment Management, Université de Provence, France, 2006

Post-doctoral Scholarship from Texas A&M in Galveston, Department of Marine Biology (2017 - 2019).

Marie Curie Fellowship, Seventh Framework Programme. CREAM (Mechanistic Effect Models for Ecological Risk Assessment of Chemicals) Project Fellow (2010 - 2014).

Awardee from the Exchange Programme CREPUQ with the Université du Québec à Rimouski, Québec, Canada (2005 – 2006).

## Academic Appointments

Assistant Professor, Environmental Sciences, Institute for a Sustainable Environment and Department of Biology, Clarkson University, 2019-2022

## Prior Experience

Society of Environmental Toxicology and Chemistry (SETAC) Member

Society of Environmental Toxicology and Chemistry (SETAC) Wildlife Toxicology Interest Group Steering Committee Member

The Wildlife Society Member

## Professional Affiliations

Society of Environmental Toxicology and Chemistry (SETAC) Member

Society of Environmental Toxicology and Chemistry (SETAC) Wildlife Toxicology Interest Group Steering Committee Member

The Wildlife Society Member

## Publications

Hala, D., Faulkner, P., He, K., Kamalanathan, M., Brink, M., Simons, K., Apaydin, M., Hernout, B., Petersen, L.H., Ivanov, I. and Qian, X., 2021. An integrated in vivo and in silico analysis of the metabolism disrupting effects of CPI-613 on embryo-larval zebrafish (*Danio rerio*). *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology*, p.109084.

Copat C, Ferrante M, Hernout BV, Giunta F, Grasso A, Messina A, Grasso R, Spina MT, 2020. Trace elements bioaccumulation in Stone Curlew (*Burhinus oedipoda*, Linnaeus, 1758): a case study from Sicily (Italy). *International Journal of Molecular Sciences*, 21(13), 4597. doi:10.3390/ijms21134597.

Hernout BV, Leleux J, Lynch J, Ramaswamy K, Faulkner P, Matich P, Hala D, 2020. The integration of fatty acid biomarkers of trophic ecology with pollutant body-burdens of PAHs and PCBs in four species of fish from Sabine Lake, Texas. *Environmental Advances*. 1, 100001. doi.org/10.1016/j.envadv.2020.100001.

Hala D, Cullen J, Hernout BV, Ivanov I, 2018. In silico predicted transcriptional-regulatory control of steroidogenesis in spawning female fathead minnows (*Pimephales promelas*). *Journal of Theoretical Biology*, 14; 455-179-190. doi: 10.1016/j.jtbi.2018.07.020.

Hernout BV, Gibson LJ, Walmsley AJ, Arnold KE, 2018. Interspecific variation in the spatially-explicit risks of trace metals to songbirds. *The Science of the Total Environment*, 642: 679–689. doi.org/10.1016/j.scitotenv.2018.05.390.

Ferrante M, Spina MT, Hernout BV, Grasso A, Messina A, Grasso R, Agnelli P, Brundo MV, Copat C, 2018. Trace elements bioaccumulation in liver and fur of *Myotis myotis* from two caves of the eastern side of Sicily (Italy): a comparison between a control and a polluted area. *Environmental Pollution*, 7; 240:273-285. doi: 10.1016/j.envpol.2018.04.133.

Hernout BV, Arnold KE, McClean CJ, Walls M, Baxter M, Boxall ABA, 2016. A national level assessment of metal contamination in bats. *Environmental Pollution*, 214: 847–858. doi:10.1016/j.envpol.2016.04.079.

Kistler WM, Hock S, Hernout BV, Brake E, Williams N, Downing C, Dunham NR, Kumar N, Turaga U, Parlos JA, Kendall RJ, 2016. Plains lubber grasshopper (*Brachystola magna*) as a potential intermediate host for *Oxyspirura petrowi* in northern bobwhites (*Colinus virginianus*). *Parasitology Open*, 2(7): 1-8.

Hernout BV, McClean CJ, Arnold KE, Walls M, Baxter M, Boxall ABA, 2016. Fur: a non-invasive approach to monitor metal exposure in bats. *Chemosphere*, 147: 376-381. doi:0.1016/j.chemosphere.2015.12.104.

Hernout BV, Pietravalle S, Arnold KE, McClean CJ, Aegerter J, Boxall ABA, 2015. Interspecies variation in the risks of metals to bats. *Environmental Pollution*. Volume 206: 209-216. doi:10.1016/j.envpol.2015.06.016.

Hernout BV, Bowman SR, Weaver R, Jayasinghe CJ, Boxall ABA, 2015. Implications of in vitro bioaccessibility differences for the assessment of risks of metals to bats. *Environmental Toxicology and Chemistry*, 34(4): 898–906. doi:10.1002/etc.2871.

Hernout BV, Somerwill K, Arnold KE, McClean CJ, Boxall ABA, 2013. A spatially-based modeling framework for assessing the risks of soil-associated metals to bats. *Environmental Pollution*, 173: 110-116. doi:10.1016/j.envpol.2012.08.017.

Hernout BV, Arnold KE, McClean CJ, Grimm V, Boxall ABA, 2011. Predicting the threats of chemicals to wildlife: What are the challenges? *Integrated Environmental Assessment and Management*, 7(3): 499-506. doi:10.1002/ieam.198.

## **Presentations**

### ***Selected Oral Presentations***

**Keute J\*, Hernout BV, 2022. The Efficiency of Washing Techniques to Eliminate External Contamination of Trace Metals in Bat Fur and Bird Feathers. RAPS (Research and Project Showcase) Conference, Clarkson University.**

**Spotlight speaker: Wildlife Toxicology Group SETAC. Spring 2022.**

**Hernout BV, Hernandez E, Hala D, 2018. PAHs and PCBs levels and associated biomarker activity in fish from Galveston Bay (TX) following Hurricane Harvey. Harvey Research Symposium, Port Aransas.**

**Hernout BV, Bowman SR, Weaver R, Jayasinghe CJ, Boxall ABA, 2013. Assessing metal bioaccessibility from invertebrates to bats using an In Vitro Gastric Model, CREAM Open Conference, Leipzig, Germany.**

**Hernout BV, Somerwill K, Arnold KE, McClean CJ, Boxall ABA, 2013. Predicting exposure of bats to soil-associated metals: Model evaluation. SETAC Europe, Glasgow, UK.**

**Hernout BV, Somerwill K, McClean CJ, Arnold KE, Boxall ABA, 2011. Predicting exposure of *Pipistrellus* sp. to soil associated metals, SETAC North America, Annual Meeting, Boston, USA.**

**Hernout BV, Somerwill K, McClean CJ, Arnold KE, Boxall ABA, 2011. Predicting exposure of *Pipistrellus* sp. to soil-associated metals, SETAC 2nd Young Environmental Scientists Meeting, Aachen, Germany.**

### ***Selected Poster Presentations***

**Jemal H\*, Hernout BV, 2022. The toxicological effects of two halogenated methoxyphenols found in the Great Lakes on *Daphnia magna*. RAPS (Research and Project Showcase) Conference, Clarkson University.**

**Giunta F\*, Hernout BV, 2021. Trace metal contamination in bats: an overview from literature data. RAPS (Research and Project Showcase) Conference, Clarkson University.**

**Keute J\*, Hernout BV, 2021. A Review of Methylmercury (MeHg) and Total Mercury (THg) Levels in Bird Feathers. RAPS (Research and Project Showcase) Conference, Clarkson University.**

**Keute J\*, Hernout BV, 2021. Testing an Efficient Method to Remove External Contamination in Feathers Prior to Trace Metal Analysis. RAPS (Research and Project Showcase) Conference, Clarkson University.**

**Hernandez E, Hernout BV, Hala D, 2018. Physiological effects and pollutant levels in fish from Galveston Bay following Hurricane Harvey. OCEANUS (NSF Program) symposia, Undergraduate Research Poster Session at Texas A&M University, College Station.**

**Hernout BV, Arnold KE, McClean CJ, Walls M, Baxter M, Boxall ABA, 2013. Trace metal elements in the common pipistrelle bat (*Pipistrellus pipistrellus*), SETAC Europe, Glasgow, UK.**

**Hernout BV, Somerwill K, McClean CJ, Arnold KE, Boxall ABA, 2011. Predicting exposure of *Pipistrellus* sp. to soil-associated metals, SETAC 21st Europe Annual Meeting, Milan, Italy.**

***\*Students supervised by BVH***

## Project Experience

Conducted state of science review related to diet of bat species present in the UK.

Conducted state of science review on bioaccumulation factors (BAFs) of metals from soil into invertebrates.

Developed a spatially explicit modeling framework to predict risk of soil-associated metals to bats in England and Wales using a food chain model and a risk characterization approach. The model was next used to assess risk of soil-associated metals to several bat species and passerine birds present in England and Wales.

Analyzed metal (Cadmium, Copper, Lead, and Zinc) concentrations in bat tissues using ICP-MS techniques. This dataset was used to perform a model estimation by comparing risk predictions against a monitoring dataset.

Developed an In vitro gastric model to assess the bioaccessibility of metals to insectivorous bats. Refined estimations of the amount of metals readily accessible in the blood stream through the digestive tract of bats using the bioaccessible fraction.

Performed a state of the science literature review on molecular effects in reptiles after exposure to Polycyclic Aromatic Hydrocarbons (PAHs) and other organic chemicals.

Evaluated enzymatic effects of crude oil, dispersant and the mixture of dispersant and crude oil in hepatic tissues of the loggerhead sea turtle (*Caretta caretta*) using Western blotting techniques.

Analyzed Polychlorinated Biphenyl (PCBs) and PAH concentrations in hepatic tissues of bull shark (*Carcharhinus leucas*), alligator gar (*Atractosteus spatula*), red drum (*Sciaenops ocellatus*), and gafftopsail catfish (*Bagre marinus*) from the Gulf of Mexico using GC-MS, and analyzed their associated enzymatic activities using GST and EROD assays.

Assessed risk of dioxin-like PCBs in fish from the Gulf of Mexico using the toxic equivalent (TEQ) approach.

Performed exposure trials of CPI-613 (mitochondrial metabolism inhibitor) on embryo-larval zebrafish (Danio rerio) to study the metabolic pathways potentially altered after CPI-613 exposure.

Performed data curation of a stoichiometric metabolism model of zebrafish (Danio rerio).

Conducted state of science review on mercury concentrations in bird feathers and trace metal concentrations in bat tissues.

Evaluated methods used to remove potential external contamination of metals in bird feathers and bat fur prior to trace metal analysis.

Evaluated the LC50 and EC50 (immobilization) of two halogenated methoxyphenols found in the Great Lakes on Daphnia magna.

### Additional Education & Training

Coastlines & People (CoPe). 2018. NSF Scoping Session Workshop, San Diego CA, USA. Research needs related to advancing understanding of the impacts of coastal environmental variability and natural hazards on populated coastal regions.

Course: "Career Development." 2012. CREAM Network. Aachen, Germany.

Course: "Complementary Skills:" oral presentations, writing of grant proposals, scientific writing, and poster presentations. 2011. CREAM Network. Rennes, France.

Course: "Statistics with R and Spatial analyses with ARCGIS." 2011. CREAM Network. Holte, Denmark.

Course at regulatory authority Chemicals Regulation Division (CRD). 2010. CREAM Network. York, UK.

Ecotoxicology and Risk Assessment. 2010. CREAM Network. University of York, UK.

Ecological Modeling. 2010. CREAM Network, Bad Schandau, Germany.

### Editorships & Editorial Review Boards

Member of the Editorial Board of Toxics as a Topic Editor.

Member of the Editorial Board of Environmental Toxicology and Chemistry (SETAC).

### Peer Reviews

Nature Scientific Reports; Nature Sustainability; Chemosphere; Environmental Pollution; Environmental Toxicology and Chemistry; Global Ecology and Conservation; Environmental Science and Pollution Research; Ecological Indicators; Environment and Natural Resources Research; Biological Trace Element Research.

Peer- reviewer of Ecotoxicology by Pamela Welbourn (Queen's University, Ontario), David Wright (University of Maryland, Baltimore), Peter Hodson (Queen's University, Ontario), and Peter Campbell (Université du Québec, Montréal) Cambridge University Press, October/ November 2020.