BIOGRAPHICAL SKETCH

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NAME: Brian Buckley

eRA COMMONS USER NAME (credential, e.g., agency login): BBUCKLEY

POSITION TITLE: Executive Director, Laboratories

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of New Hampshire	B.S.	1983	Chemistry
North Carolina State University	Ph.D.	1989	Analytical Chemistry
Oak Ridge National Laboratory	Post-Doc	1989-1990	Analytical Laser Mass Spectrometry

A. Personal Statement

I am the Executive Director and Director of Research at the Environmental and Occupational Health Sciences Institute (EOHSI). I am also Director of our NIEHS Center Facility Core (P30ES05022) and the Director of the Rutgers Disaster Response Initiative (RUDRI). I am a graduate faculty member in Environmental Sciences, Chemistry and Chemical Biology, Toxicology and Environmental and Occupational Health. Having received a PhD in Analytical Chemistry for instrument design and modification, the focus of my research was to improve the sensitivity of plasma spectrometers. I acquired my experience developing new methods for quantifying small molecule and elemental analytes as the director of our NIEHS chemical analysis facility core. Supporting the Centers and external NIH investigators; my work is largely identifying and quantifying xenobiotic molecules for biomonitoring or toxicology focused projects where quantitation of bioactive contaminants is the principal goal. My research focus is analytical methods development or adaptation for identifying and quantifying exogenous chemicals, metabolites, drugs and therapeutics, nutritionally relevant small molecules and emerging contaminants. Methods development in both biomarker discovery and targeted analytes include those for chemicals such as; chemotherapeutics, zeranols (an estrogenic grain mycotoxin), phytoestrogens, anthocyanins, folates, and pyrethroid pesticides. Most recently our research objectives have centered on non-targeted high resolution MS for identification of unknown contaminants and metabolomics. In addition to bio-monitoring studies, we use multiple ICPMS, LC/MS and GC/MS methods to quantify targeted and unknown small molecule bioactive compounds in environmental samples. My group developed inorganic and organometallic speciation assays using ion chromatography coupled to inductively coupled plasma mass spectrometry and most recently performed source apportionment using isotopic ratios. In all I have published more than 150 papers on methods development or application.

My primary role on Center grants is to provide analytical support through methods development for analytes not previously characterized in literature methods or to adapt exiting methods to meet the emerging needs of the investigators. We also provide toxicological as well as PK/PD support. Most applicable to this submission is our work with a new class of chemotherapeutics based on ruthenium as the metal center rather than platinum, supported the discovery of their antimetastatic properties and our published quantitation methods in multiple biological matrices (culture and tissue) allowed for the progression of these compounds from organometallic synthesis products toward new drug candidates.

Most related publications to the current proposal (***as the corresponding author):**

1. Karas, B. F., Doherty, C. L., Terez, K. R., Côrte-Real, L., Cooper, K. R., Buckley, B. T.* Dose Uptake of Platinum- and Ruthenium-based Compound Exposure in Zebrafish by Inductively Coupled Plasma Mass Spectrometry with Broader Applications. JoVE, (182), e63587, doi:10.3791/63587 (2022).
2. Brunetti, L., Wang, L., Wassef, A., Gong, Y., Brinker, A., Buckley, B., Lipsky, P. E., Ondar, P., Poiani, G., Zhao, L., Kong, A-N., and Schlesinger, N., Pharmacokinetics and Pharmacodynamics of

Anthocyanins after Administration of Tart Cherry Juice to Individuals with Gout, Molecular Nutrition & Food Research (2023) DOI: 10.1002/mnfr.202200550.R2

3. Karas, B.F., Côrte-Real, L., Doherty, C.L., Valente, A., Cooper, K.R. and Buckley, B.T., * 2019. A novel screening method for transition metal-based anticancer compounds using zebrafish embryo-larval assay and inductively coupled plasma-mass spectrometry analysis. Journal of Applied Toxicology.
4. Szilagyi, J., Gorczyca, L., Brinker, A., Buckley, B., Laskin, J., Aleksunes, L., 2019. Placental BCRP/ABCG2 transporter prevents fetal exposure to the estrogenic mycotoxin zearalenone. Toxicol. Sci. 168(2):394-404. PMCID:PMC6432861.
5. Lioy, P., Weisel C., Millett J., Eisenreich S., Vallero D., Offenberg J., Buckley B., Turpin B., Zhong M., Cohen M., Prophete C., Yang I., Stiles R., Chee G., Johnson W., Alimokhtari S., Weschler C., Chen L., Characterization of the dust/smoke aerosol that settled east of the World Trade Center (WTC) in lower manhattan after the collapse of the WTC September 11, 2001, Environ. Health Per. 110, 703-714, 2002.

Current Research Support

P30ES05022 Zarbl (PI) 1.8 months 05/08/2019-03/31/2024
NIEHS Center of Excellence, Chemical Analysis Facility Core
Goal: To provide organized advanced analytical atomic and molecular (GC and LC)/mass spectral support for investigators at the Rutgers NIEHS Center.
Role: Facility Core Director

Selected and Recently Completed Research Support

NIH (PI: Kong) 1R01AT009152-01 Buckley (Co-I) 0.6 months 09/15/2015-08/31/2020
Epigenetic mechanisms of indole-3-carbinol/diindolylemthane and triterpenoids in prevention of prostate inflammation and related disease
Analytical core: Core-Co-Leader & Chemical Analytical: Service Manger
Goal: To provide analytical mass spectral support for investigators in their investigation of chemopreventaitve and chemotherapeutic agents

Veterans Administration 2.4 months 04/01/2019-9/30/2019
Biochemical and Cell Biology Assays for Ongoing Airborne Hazards and Burn Pit Studies at East Orange
Goal: Investigate the proposed mechanism that a change in baseline inflammatory state as a result of burn pit smoke exposure leads to dysfunction in ventilation/perfusion match and/or peripheral blood flow control.

B. Positions, Scientific Appointments, and Honors

Positions and Employment

2021-	Executive Director, Director of Research EOHSI,
2019 -	Graduate Faculty Chemistry and Chemical Biology
2017 -	Director Rutgers University Disaster Response Initiative (RUDRI)
2014 -	Associate Director of Administration, Executive Director Laboratories EOHSI
2010 -	Adjunct Faculty Associate Professor, School of Public Health
2008 -	Graduate Faculty Joint Graduate Program in Toxicology
2003 -	Executive Director Laboratories, EOHSI
2001 -	Adjunct Associate Professor, UMDNJ School of Public Health, Piscataway, NJ
2001-03	Acting Executive Director, EOHSI
1995 -	Graduate Faculty of Environmental Science Rutgers University
1994 -	Chemical Analysis Facility Core Director NIEHS Center
1991-00	Director Laboratories and Facilities Environmental Occupational Health Sciences Institute (EOHSI), Rutgers, The State University of New Jersey
1990-91	Laboratory Manager, Nestle Quality Assurance Laboratory
1984	Research Chemist Army Corps. of Engineers CRRE Laboratory

Other Experience and Professional Memberships

2021	NIEHS Collaborative Centers in Children's Environmental Health Research and Translation
2021	NIEHS DR2 Executive Committee

2019 - NIEHS Disaster Response Research Committee (DR2)
2019 NIH HHEARS review Panel
2017 - 21 NIH Superfund Review Panel
2017- American Society of Mass Spectrometry
2017- Society of Toxicology
2015- 18 EPA External Laboratory Advisory Board (ELAB)
2010 - NJDEP Science Advisory Board Water Quality and Quantity Standing Committee
2009-16 Editorial Board Journal of Environmental and Public Health
2009 - NIH Review Panel Shared Instrumentation Grants (ad hoc)
2009-10 NIH Review Panel Community Based Research Projects (ad hoc)
2009 EPA Science Advisory Panel on Pesticide Volatilization
2005-06 Society of Research Administrators International
2002-03 NJDOHSS Biomonitoring Advisory Committee
2001 - EPA SW-846 Inorganic/Metals Workgroup
1998 International Society of Exposure Science
1998 - NIST Speciated Standards Workgroup
1989 - Society of Applied Spectroscopy
1983 - American Chemical Society

Honors and Awards

Virgil Payne Award for Outstanding Chemical Service Achievement 2003
NIH Travel Award Metabolic Profiling Conference 2003
Merit Awards Administrative Professionals Rutgers University 1993-1994
Merit Awards Administrative Professionals Rutgers University 1995-1996
Merit Awards Administrative Professionals Rutgers University 1997
Outstanding Teaching Award NCSU 1987-1988

C. Contributions to Science

My overall research goal is to enhance measurement science capabilities as they are applied to environmental health studies to measure chemical or biological contaminants and/or their biomarkers of exposure. My PhD training in Analytical Chemistry has now been utilized for more than 25 years on both instrument modification and methods development projects. My experience developing new methods for quantifying small molecule and metal analytes as the director of an NIEHS chemical analysis facility core provides support to both Center's and external NIH investigators. The facility core is mass spectrometric based as we work with inductively coupled plasma mass spectrometry (ICPMS), high performance liquid chromatography mass spectrometry (HPLC/MS) and gas chromatographic mass spectrometry (GC/MS) all in both high resolution and low-resolution platforms but our research objectives are always those of the investigators who need our services. Recently we have begun to work with untargeted analysis or metabolites, but our laboratory is unique in that our previous targeted analysis has been focused on exogenous metabolites and they will also be the focus of our untargeted work. This facility core is unique in taking this approach as few labs are performing untargeted metabolomics. It also allows us to remain cutting edge in developing methods for emerging contaminants and their biotransformation products. Remaining current with analytical methods and even anticipating the needs of the investigators based on evaluating trends in new compounds of interest, remains a significant portion of what our core does and where I focus the efforts of our analysts. This pursuit of remaining state of the art with analytical methods allows for bot a retrospective assessment of measurement science and a projection of where the science may be heading. The primary reason for taking this responsibility is so that our investigators do not have to worry about how to measure a compound and can focus on what is does, either in the environment or in the biological host.

I have published more than 150 journal articles and book chapters, 23 State Reports, given more than 50 invited presentations and have 200+ conference proceedings and abstracts, all on the development or use of analytical methods. Our assays have been utilized by investigators throughout the country in addition to those of our Institute and the methods papers demonstrate their applicability.

Metal Quantitation in Studies Using In vivo and In vitro Models Quantitation is vital in understanding both the bioavailability and toxicity of metals, studied as either contaminants or as nutrients and drugs. Using

microextraction and enhanced digestion (e.g., microwave enhancement) we are able to generate quantitative data used in PK/PD and toxicological assessments of metals in biological models.

1. Stratton, S.A., Ettinger, A.S., Doherty, C.L. and Buckley, B.T.,* 2022. The lead and copper rule: Limitations and lessons learned from Newark, New Jersey. Wiley Interdisciplinary Reviews: Water, p.e1620.
2. D'Errico, J.N., Doherty, C., George, J.R., Buckley, B. and Stapleton, P.A., 2022. Maternal, placental, and fetal distribution of titanium after repeated titanium dioxide nanoparticle inhalation through pregnancy. Placenta, 121, pp.99-108; PMC9010360.
3. Buckley, B.T.*, Buckley, R. and Doherty, C.L., 2021. Moving toward a Handheld "Plasma" Spectrometer for Elemental Analysis, Putting the Power of the Atom (Ion) in the Palm of Your Hand. Molecules, 26(16), p.4761.
4. Wen, X., Kozlosky, D., Zhang, R., Doherty, C., Buckley, B., Barrett, E., and Aleksunes, L., BCRP/ABCG2 transporter regulates accumulation of cadmium in kidney cells: role of the Q141K variant in modulating nephrotoxicity. Drug Metab Dispos, 49(8), 629-637; 2021. PMC8382159.

Mass Spectrometric Measurement of Xenobiotics (eg zeranol) or Biomarkers by LC/MS As xenobiotics emerge and their biomarkers of exposure or effect, they are evaluated for significant human biological activity, and must be quantified in toxicological or exposure scenarios. NIH investigators require this analytical capability, where methods have not previously existed. These methods are utilized by both internal and external investigators. Many analyte methods have been developed for specific projects (zearalenol and zeranol) but utilized by investigators across multiple disciplines. We have also developed LC/MS methods for bile acids as markers for disease as well as for quantifying non-volatile/semi-volatile contaminants and biomarkers.

1. Lazofsky, A. and Buckley, B.*, 2022. Recent Trends in Multiclass Analysis of Emerging Endocrine Disrupting Contaminants (EDCs) in Drinking Water. Molecules, 27(24), p.8835.
2. Li, W., Yang, H., Buckley, B., Wang, L. and Kong, A.N., 2018. A novel triple stage ion trap MS method validated for curcumin pharmacokinetics application: A comparison summary of the latest validated curcumin LC/MS methods. Journal of Pharmaceutical and Biomedical Analysis, 156, pp.116-124. PMC5984715.
3. Lin, H., Yu, X., Eng, O.S., Buckley, B., Kong, A.N.T., Bertino, J.R., Carpizo, D.R. and Gounder, M.K., (2015). A sensitive liquid chromatography–mass spectrometry bioanalytical assay for a novel anticancer candidate–ZMC1. Biomedical Chromatography, 29(11), pp.1708-1714. PMC5481844.
4. Bandera EV, Chandran U, Buckley B, Lin Y, Isukapalli S, Marshall I, King M, Zarbl H. 2011. Urinary mycoestrogens, body size and breast development in New Jersey girls. Science of the Total Environment. 409(24):5221-5227. PMC3312601.

Source Identification and biomonitoring by Inductively Coupled Plasma Mass Spectrometry. Originally, we created methods for metal speciation using chromatographic separation techniques, coupled to ICPMS These methods were requested to validate two new standard reference materials by NIST and the principal research for securing the NIH shared instrumentation grant. With the inset of lead contamination in drinking water, the need for apportionment of metal contaminant sources ahs become a more significant focus of our research objectives. Moving from concomitant metal concentrations to now isotopic signatures, our high resolution ICPMS methods are employed to both assess risk and support mitigation strategies to protect vulnerable populations.

1. Doherty, C., L., and Buckley, B. T., * Translating Analytical Techniques in Geochemistry to Environmental Health, Molecules. 26(9):2821. 2021. PMC8126036.
2. Alquezar, C., Felix, J.B., McCandlish, E., Buckley, B.T., Caparros-Lefebvre, D., Karch, C.M., Golbe, L.I. and Kao, A.W., 2020. Heavy metals contaminating the environment of a progressive supranuclear palsy cluster induce tau accumulation and cell death in cultured neurons. Scientific Reports, 10(1), pp.1-12. PMC6969162.
3. Guerrier, R., Doherty, C., Smith, L.C., Pivnick, E., Aleksunes, L., Buckley, B. and Laskin, D., 2019. From the community to the laboratory: field research to advance student learning. The FASEB Journal, 33(1_supplement), pp.598-22.
4. Carolina, A., Felix, J.B., McCandlish, E., Buckley, B.T., Caparros-Lefebvre, D., Karch, C.M., Golbe, L.I. and Kao, A.W., 2020. Heavy metals contaminating the environment of a progressive supranuclear palsy cluster induce tau accumulation and cell death in cultured neurons. Scientific Reports (Nature Publisher Group), 10(1). PMC6969162.

Solid Phase Micro Extraction (SPME) and GC/MS Detection Solid phase microextraction was new method for sample preparation and introduction in GC/MS methods. We employed this technology far beyond its original headspace applications to include direct insertion for liquid samples and many biological and environmental matrices not previously attempted. We are moving this technology into the field for sampling of many SVOCs for everything from microplastics contamination of water to pesticides in air. We use SPME for almost all laboratory SVOC and VOC applications. It has become indispensable as a sample introduction technique when coupled with GC/MS unknown identification. This method was the primary measurement tool for a report to the NJDEP identifying more than 750 previously unidentified compounds in drinking water samples throughout the state of NJ.

1. Wren, M., Liu, M., Vetrano, A., Richardson, J.R., Shalat, S.L. and Buckley, B.,* 2021. Analysis of six pyrethroid insecticide metabolites in cord serum using a novel gas chromatography-ion trap mass spectrometry method. Journal of Chromatography B, 1173, p.122656; PMID: 33819796.
2. Lewinski, R., Hernik, A., Liszewska, M., Buckley, B., Czaja, K., Korcz, W., Słomczynska, A., and Strucinski, P., Validation of a Modified QuEChERS Method for the Determination of Selected Organochlorine Compounds in Honey. Molecules 2023, 28, 842.
3. Ravit, B., Cooper, K., Moreno, G., Buckley, B., Yang, I., Deshpande, A., Meola, S., Jones, D. and Hsieh, A., (2018) Microplastics in urban New Jersey freshwaters: distribution, chemical identification, and biological affects, Aims Environmental Science, 4(6), pp.809-826
4. Richardson, J. R., Roy, A., Shalat, S. L., von Stein, R. T., Hossain, M. M., Buckley, B., Geraing M., Levey, A., & German, D. C. (2014). Elevated serum pesticide levels and risk for Alzheimer disease. JAMA Neurol. 71(3):284-90. PMCID 4132934

Measurement of Environmental Contaminants in a Rapid Response. Our core also provides/supports emergency response initiatives such as, a contaminant scan of the dust from the World Trade Center immediately after 911, mold VOCs immediately after hurricanes Sandy and Maria, mycotoxins and fungicides from homes damaged by hurricanes Sandy and Maria. Our most recent response was to evaluate disinfection technologies used in the COVID crisis for both safety and efficacy. All of these applications were aimed at protecting vulnerable populations and all required cutting-edge measurement science techniques.

1. Lazofsky, A., Doherty, C., Szary, P. and Buckley, B.,* 2022. A surface sampling and liquid chromatography mass spectrometry method for the analysis of quaternary ammonium compounds collected from public transportation buses in New Jersey. Emerging contaminants, 8, pp.318-328.
2. Ultraviolet (UV) and other disinfection devices for public transit in response to COVID-19 FINAL REPORT in cooperation with New Jersey TRANSIT, August 2020 Submitted by: P. Szary,* B. Buckley,* J.Gong, S. Mott, C. Doherty, and N. Renkel.
3. Zhao, G., Yin, G., Inamdar, A. A., Luo, J., Zhang, N., Buckley, B., & Bennett, J. W. (2017). Volatile organic compounds emitted by filamentous fungi isolated from flooded homes after Hurricane Sandy show toxicity in a Drosophila bioassay. Indoor Air 27(3), pp.518-528. PMID: 27748984.
4. Yiin, L-M., Millette, J., Vette, A., Ilacqua, V., Quan, C., Gorczynski, J., Kendall, M., and Chen, L., Weisel, C., Buckley, B., Yang, I., and Lioy, P. “Comparisons of the dust/smoke particulate that settled inside the surrounding buildings and outside on the streets of southern new york city after the collapse of the World Trade Center, 11 September 2001”, Journal of Air and Waste Management, 54: 515-528, 2004.

A more complete list of my publications can be found at:
https://pubmed.ncbi.nlm.nih.gov/?term=b+buckley+rutgers