BIOGRAPHICAL SKETCH

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NAME: Boersma, Melissa

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

POSITION TITLE: Director

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)	END DATE MM/YYYY	FIELD OF STUDY
University of Wisconsin, Madison, Madison, Wisconsin	BS	1999	Biochemistry
University of Wisconsin, Madison, Madison, Wisconsin	PHD	2008	Chemistry

A. Personal Statement

My career has focused on the use of chromatography and mass spectrometry for the analysis of peptides, proteins, and metabolites. I greatly enjoy working in a core facility where I am exposed to and challenged by a wide variety of research including the analysis of Toxoplasma gondii infection of Xenopus laevis larve. As a scientist at PPD, I developed methods for the analysis of pharmaceuticals with HPLC and GC, thereby laying the foundation of reproducible chromatographic separation of substances. My graduate work at UW Madison expanded my capabilities to the separation of peptides and proteins while utilizing mass spectrometry to characterize these larger compounds. As an assistant researcher at the Biotechnology Core Facilities, I was involved in numerous projects that required troubleshooting, optimizing, and maintaining a wide variety of instruments from mass spectrometers to pin printers to peptide synthesis instruments. My successes frequently came from learning and optimizing the esoteric instrument specific software to perform and improve on the acquisition and analysis the experiments. At Auburn University I've contributed to many research projects in a variety of departments and neighboring schools, including Alabama State, Tuskegee, and Columbus State Universities. My role as director of the center involves teaching students as well as administrative functions such as budgeting, space allocation, and personnel. Thus, I have demonstrated a record of accomplishment in a wide variety of subjects while focusing on using mass spectrometry.

1. Sharma HN, Catrett J, Nwokeocha OD, Boersma M, Miller ME, Napier A, Robertson BK, Abugri DA. Anti-Toxoplasma gondii activity of Trametes versicolor (Turkey tail) mushroom extract. Sci Rep. 2023 May 29;13(1):8667. PubMed Central PMCID: PMC10225767.

B. Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

2016 - Director, Auburn University, Auburn, AL
2014 - 2016 Principle Scientist, Stemina Biomarker Discovery, Madison, WI
2009 - 2014 Assistant Researcher, University of Wisconsin, Madison, WI
1999 - 2002 Scientist, PPD, Madison, WI

Honors

1998 Phi Beta Kappa, University of Wisconsin-Madison
1998 Phi Kappa Phi, University of Wisconsin - Madison
1998 Golden Key National Honor Society, University of Wisconsin - Madison

C. Contribution to Science

1. Auburn University has provided enjoyable research experiences.
    a. He J, Boersma M, Song Z, Krebsbach S, Fan D, Duin EC, Wang D. Biochar and surfactant synergistically enhanced PFAS destruction in UV/sulfite system at neutral pH. Chemosphere. 2024 Apr;353:141562. PubMed PMID: 38417493.
    b. Higgins C, Cohen ND, Slovis N, Boersma M, Gaonkar PP, Golden DR, Huber L. Antimicrobial Residue Accumulation Contributes to Higher Levels of Rhodococcus equi Carrying Resistance Genes in the Environment of Horse-Breeding Farms. Vet Sci. 2024 Feb 17;11(2) PubMed Central PMCID: PMC10892917.
    c. Rudar M, Gachman A, Boersma M. Technical note: simultaneous determination of amino thiols in pig tissue by ultra-high performance liquid chromatography with fluorescence detection. J Anim Sci. 2023 Jan 3;101 PubMed Central PMCID: PMC9940738.
    d. Wang P, Tyndall S, Rahman T, Roy P, Jahromi H, Adhikari S, Boersma M. Sorption and recovery of phenolic compounds from aqueous phase of sewage sludge hydrothermal liquefaction using bio-char. Chemosphere. 2022 Jan;287(Pt 1):131934. PubMed PMID: 34478966.
2. At UW-Madison, I was an assistant researcher in the UW Biotechnology core facility and also worked for Professor John Denu. Professor Denu is an expert in NAD-dependent deacylases (sirtuins) and studies epigenetic chromatin alterations that regulate cell signaling and metabolism.
    a. Yang Z, Qian S, Scheid RN, Lu L, Chen X, Liu R, Du X, Lv X, Boersma MD, Scalf M, Smith LM, Denu JM, Du J, Zhong X. EBS is a bivalent histone reader that regulates floral phase transition in Arabidopsis. Nat Genet. 2018 Sep;50(9):1247-1253. PubMed Central PMCID: PMC6556434.
    b. Qian S, Lv X, Scheid RN, Lu L, Yang Z, Chen W, Liu R, Boersma MD, Denu JM, Zhong X, Du J. Dual recognition of H3K4me3 and H3K27me3 by a plant histone reader SHL. Nat Commun. 2018 Jun 21;9(1):2425. PubMed Central PMCID: PMC6013494.
    c. Lee JH, Yang B, Lindahl AJ, Damaschke N, Boersma MD, Huang W, Corey E, Jarrard DF, Denu JM. Identifying Dysregulated Epigenetic Enzyme Activity in Castrate-Resistant Prostate Cancer Development. ACS Chem Biol. 2017 Nov 17;12(11):2804-2814. PubMed Central PMCID: PMC6594041.
    d. Su Z, Wang F, Lee JH, Stephens KE, Papazyan R, Voronina E, Krautkramer KA, Raman A, Thorpe JJ, Boersma MD, Kuznetsov VI, Miller MD, Taverna SD, Phillips GN Jr, Denu JM. Reader domain specificity and lysine demethylase-4 family function. Nat Commun. 2016 Nov 14;7:13387. PubMed Central PMCID: PMC5114558.
3. It was a pleasure working with many research groups while in the UW Biotechnology core facility.
    a. Cho PY, Joshi G, Boersma MD, Johnson JA, Murphy RM. A Cyclic Peptide Mimic of the β-Amyloid Binding Domain on Transthyretin. ACS Chem Neurosci. 2015 May 20;6(5):778-89. PubMed Central PMCID: PMC4797071.
    b. Hayouka Z, Chakraborty S, Liu R, Boersma MD, Weisblum B, Gellman SH. Interplay among subunit identity, subunit proportion, chain length, and stereochemistry in the activity profile of sequence-random peptide mixtures. J Am Chem Soc. 2013 Aug 14;135(32):11748-51. PubMed Central PMCID: PMC3856984.
    c. Zhang N, Venkateshwaran M, Boersma M, Harms A, Howes-Podoll M, den Os D, Ané JM, Sussman MR. Metabolomic profiling reveals suppression of oxylipin biosynthesis during the early stages of legume-rhizobia symbiosis. FEBS Lett. 2012 Sep 21;586(19):3150-8. PubMed PMID: 22796495.
4. My graduate work utilized mass spectrometry to characterize modifications to and synthesis of peptides.
    a. Boersma MD, Haase HS, Peterson-Kaufman KJ, Lee EF, Clarke OB, Colman PM, Smith BJ, Horne WS, Fairlie WD, Gellman SH. Evaluation of diverse α/β-backbone patterns for functional α-helix mimicry: analogues of the Bim BH3 domain. J Am Chem Soc. 2012 Jan 11;134(1):315-23. PubMed Central PMCID: PMC3364022.

b. Boersma MD, Sadowsky JD, Tomita YA, Gellman SH. Hydrophile scanning as a complement to alanine scanning for exploring and manipulating protein-protein recognition: application to the Bim BH3 domain. Protein Sci. 2008 Jul;17(7):1232-40. PubMed Central PMCID: PMC2442000.

c. Horne WS, Boersma MD, Windsor MA, Gellman SH. Sequence-based design of alpha/beta-peptide foldamers that mimic BH3 domains. Angew Chem Int Ed Engl. 2008;47(15):2853-6. PubMed Central PMCID: PMC3429126.

d. Levitsky K, Boersma MD, Ciolli CJ, Belshaw PJ. Exo-mechanism proximity-accelerated alkylations: investigations of linkers, electrophiles and surface mutations in engineered cyclophilin-cyclosporin systems. Chembiochem. 2005 May;6(5):890-9. PubMed PMID: 15832403.

5. Additional publication while at Auburn University

a. Darakjian LI, Rigakou A, Brannen A, Qusa MH, Tasiakou N, Diamantakos P, Reed MN, Panizzi P, Boersma MD, Melliou E, El Sayed KA, Magiatis P, Kaddoumi A. Spontaneous In Vitro and In Vivo Interaction of (-)-Oleocanthal with Glycine in Biological Fluids: Novel Pharmacokinetic Markers. ACS Pharmacol Transl Sci. 2021 Feb 12;4(1):179-192. PubMed Central PMCID: PMC7887843.

Complete List of Published Work in My Bibliography:
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