BERTHA

BIG DATA CENTRE FOR ENVIRONMENT AND HEALTH

NEWSLETTER

BERTHA BigData CENTRE FOR ENVIRONMENT AND HEALTH

August 2023

BERTHA Summer School 2023
Biomarkers of Environmental Exposures and Multilevel Analysis

The 2023 edition of the BERTHA Summer School took place at the picturesque Comwell Bygholm Park in Horsens, from June 12th to 14th. This three-day academic gathering served as a dynamic platform, bringing together experts, postdocs, and Ph.D. students from diverse backgrounds to explore the captivating realm of biomarkers and environmental health research, specifically focusing on the application of Zone Designs and Multilevel Analysis. As a part of the social itinerary, participants also enjoyed visiting the Horsens Prison Museum. Summer school participants had the opportunity to delve into the latest advancements in the field, exchange ideas, and gain valuable insights from experts.

Inside this Issue

Publication Highlights

Higher depression risks in medium- than in high-density urban form across Denmark

SCIENCE ADVANCES | RESEARCH ARTICLE

EPIDEMIOLOGY

Higher depression risks in medium- than in high-density urban form across Denmark

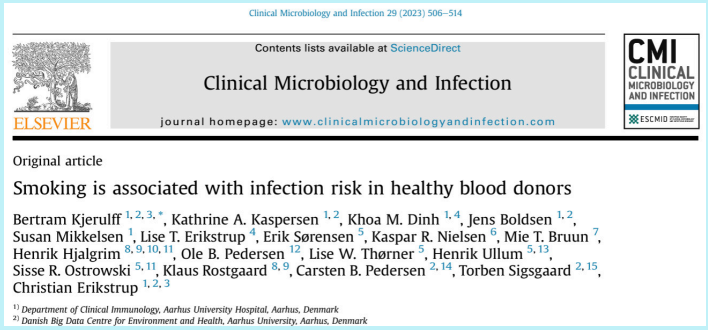
Tzu-Hsin Karen Chen[1,2,3,4,5]*, Henriette Thisted Horsdal[4,6], Karl Samuelsson[7,8,9], Ane Marie Closter[4,6], Megan Davies[4,10], Stephan Barthel[8,11], Carsten Bøcker Pedersen[4,6,12], Alexander V. Prishchepov[5], Clive E. Sabel[4,13]

Urban areas are associated with higher depression risks than rural areas. However, less is known about how different types of urban environments relate to depression risk. Here, we use satellite imagery and machine learning to quantify three-dimensional (3D) urban form (i.e., building density and height) over time. Combining satellite-derived urban form data and individual-level residential addresses, health, and socioeconomic registers, we conduct a case-control study (n = 75,650 cases and 756,500 controls) to examine the association between 3D urban form and depression in the Danish population. We find that living in dense inner-city areas did not carry the highest depression risks. Rather, after adjusting for socioeconomic factors, the highest risk was among sprawling suburbs, and the lowest was among multistory buildings with open space in the vicinity. The finding suggests that spatial land-use planning should prioritize securing access to open space in densely built areas to mitigate depression risks.

BERTHA researchers' recent publication titled "Higher depression risks in medium- than in high-density urban form across Denmark" in Science Advances suggests that dense city centers with accessible open spaces provide more opportunities for social networking, ultimately benefiting mental well-being. Similarly, well-designed suburbs with amenities like shops and cafes can help mitigate mental health issues. The Guardian and many Danish news portals featured the study and highlighted living environments' crucial role in mental health. Congratulations to BERTHA researchers Tzu-Hsin Karen Chen, Clive Sabel, Carsten Bøcker Pedersen, and all the authors for their invaluable contributions to the study. Article DOI: 10.1126/sciadv.adf3760

Smoking is associated with infection risk in healthy blood donors

While tobacco's catastrophic toll on lives through respiratory and cardiovascular diseases is well-known, the lesser-explored topic is short-term smoking effects. Bertram Kjerulff, a BERTHA researcher, unveils essential insights in his recent publication on smoking's immediate consequences. Analyzing healthy blood donors, the research reveals a striking trend: smokers require hospitalization due to infections more frequently than non-smokers. Even young smokers face a notably higher risk of respiratory tract infections, abscesses, and skin infections. Published in Clinical Microbiology and Infection, this significant study underscores the urgency of addressing smoking's swift and tangible health impacts. The study was also featured in Science News. Article DOI: 10.1016/j.cmi.2022.10.020



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Original article

Smoking is associated with infection risk in healthy blood donors

Bertram Kjerulff [1, 2, 3, *], Kathrine A. Kaspersen [1, 2], Khoa M. Dinh [1, 4], Jens Boldsen [1, 2], Susan Mikkelsen [1], Lise T. Erikstrup [4], Erik Sørensen [5], Kaspar R. Nielsen [6], Mie T. Bruun [7], Henrik Hjalgrim [8, 9, 10, 11], Ole B. Pedersen [12], Lise W. Thørner [5], Henrik Ullum [5, 13], Sisse R. Ostrowski [5, 11], Klaus Rostgaard [8, 9], Carsten B. Pedersen [2, 14], Torben Sigsgaard [2, 15], Christian Erikstrup [1, 2, 3]

[1] Department of Clinical Immunology, Aarhus University Hospital, Aarhus, Denmark
[2] Danish Big Data Centre for Environment and Health, Aarhus University, Aarhus, Denmark

More BERTHA Publications can be browsed at https://projects.au.dk/bertha/dissemination/publications

BERTHA Scientific Seminar

Public Health "Research on Research" with Big Data

In a captivating BERTHA Scientific Seminar we delved into the fascinating topic of public health research, exploring the intersection of data analytics, clinical studies, and policy change. Held on the 25th of January 2023, the seminar featured a distinguished speaker, Shawn Dolley, who serves as the Unit Leader of Tools & Innovations Design, Analyze, Communicate Integrated Development Global Health Division at The Bill & Melinda Gates Foundation.

Conducting Environmentally Sustainable Big Data Research

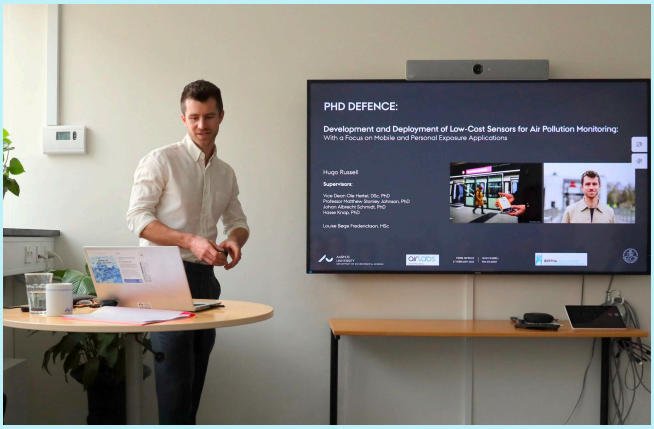
The latest BERTHA seminar held on 24th March, 2023 discussed the important domain of environmentally sustainable big data research, focusing on the complex tasks of allocating responsibilities, balancing priorities, and acknowledging injustice. Dr. Federica Lucivero, a Senior Researcher in Ethics and Data at Big Data Institute, University of Oxford, presneted in seminar. Dr. Lucivero presented the ethical implications and sustainability concerns of rapidly advancing Big Data initiatives.

BERTHA PhD Defense

Three BERTHA PHD students successfully defended their PhDs in the first half of 2023. We wish them all the best as they embark on the next phase of their academic and professional journeys. May their passion for learning and innovative contributions to big data and environmental health continue to shine brightly in the years ahead.

PhD Defense by Bertram Dalskov Kjerulff

Bertram Dalskov Kjerulff, a BERTHA member, defended his PhD thesis on Friday, 21 April 2023. Bertam was a PhD student at the Department of Clinical Medicine - Department of Clinical Immunology, Aarhus University. Bertam researched on the influence of lifestyle factors on biomarkers and health in Danish blood donors. His study examined the effects of smoking on the risk of infections, the effect of air pollution, aging, smoking, and BMI on levels of circulating biomarkers of inflammation. The studies used the data from the Danish Blood Donor Study, which includes blood donors and couple their questionnaire and laboratory data with Danish registers. The research showed how smokers are at increased risk of infections, even among very healthy blood donors. Furthermore, there are clear differences in biomarker profiles associated with air pollution and the investigated lifestyle and demographic factors.

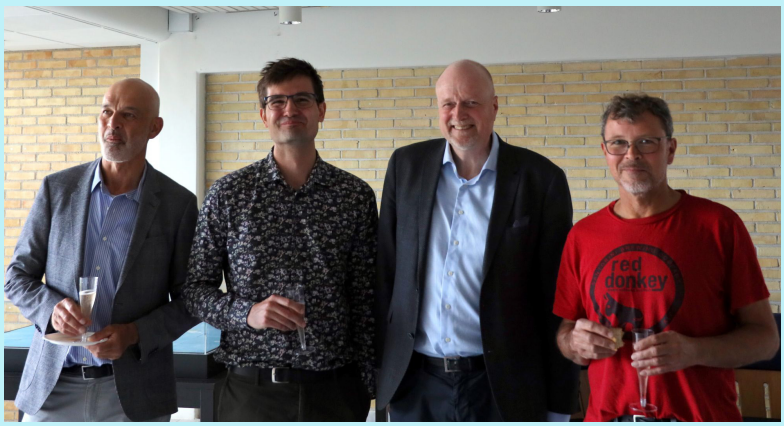


PhD Defense by Hugo Savill Russell

Hugo Savill Russell, a BERTHA member, defended his PhD thesis on Monday, 27 February 2023. Hugo was a PhD student at the Department of Environmental Science (ENVS) at the Graduate School of Technical Science, Aarhus University. During his PhD studies, Hugo researched low-cost sensors for monitoring air pollution. Hugo tested existing devices, developed new sensor nodes and calibration methods, and deployed the sensors in novel ways. This included mobile measurements in London, UK, and recording the first published measurements of air quality in the Copenhagen Metro.

PhD Defense by Christopher Andersen

Christopher Andersen, a BERTHA member, defended his Ph.D. thesis on Tuesday, 4 July 2023, at 13:00. Christopher was affiliated with the Department of Environmental Science (ENVS) at the Graduate School of Technical Science, Aarhus University. During his Ph.D., Christopher developed the new air pollution model DALM (the Danish Lagrangian Model). DALM model includes advanced descriptions of important processes in the atmosphere that are suitable for year-long simulations of airpollution on a local scale. DALM demonstrated that it could accurately model the concentrations of the most relevant pollutants for all of Denmark



Alumni Spotlight

Yanxia Zhang's BERTHA Voyage

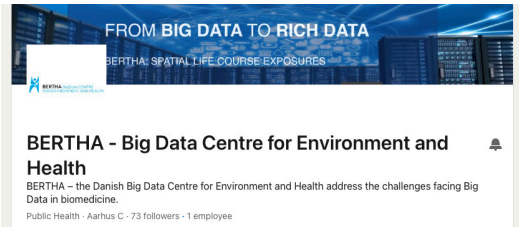
From Environmental Science to Big Data Research

I am an Associate Professor at the School of Environmental Science, Nanjing Normal University, China. I was a COFUND research fellow at the Aarhus Institute of Advanced Studies (AIAS) at Aarhus University from June 2021 to May 2023. During my fellowship, I was actively engaged in Project BERTHA. This opportunity introduced me to register-based data and equipped me with the skills to establish connections between individual residential and health data alongside national-level environmental exposure data. This experience significantly shifted my research landscape from a conventional, experimental-based approach to big data-based environmental health research. My work in BERTHA focused on a study about the associations between nitrate/trace elements exposure from Danish drinking water and cardiovascular disease. Concurrently, my AIAS project centered around plasticizer contamination and the health risks posed by the global food trade between the EU and China. This research is poised to bridge a significant gap in understanding plasticizer exposure dynamics. Relevant papers have been published in the Journals of Environmental Pollution and Science of the Total Environment, and I also made oral presentations at three international conferences. This parallel journey with BERTHA and AIAS projects enhanced my ability to refine evaluation methodologies about health risks from organic pollutant exposure, solidifying a foundation for my future endeavors.

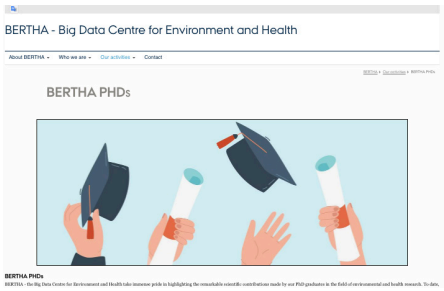
ANNOUNCEMENT FROM BERTHA CENTER

BERTHA'S LINKEDIN PAGE IS NOW LIVE

We have launched our official LinkedIn page and invite you to join us there. By following BERTHA on LinkedIn, you'll stay updated on our latest news, research findings, publications, and initiatives on Big Data and Environment Health.
Page URL: www.linkedin.com/company/bertha-big-data-centre-for-environment-and-health



DEDICATED PAGE FOR BERTHA PHD



We have started a page at BERTHA Homepage to highlighting the remarkable scientific contributions and achivmenets made by our PhD graduates in the field of environmental and health research being affilated with BERTHA. To provide you with an overview of their extensive research work and scholarly publications during their time with us, we have started to summarize each PhD graduates research area and scientific contributions in this dedicated page.
Page URL: https://projects.au.dk/bertha/dissemination/bertha-phd

NNF CHALLENGE SYMPOSIUM: BIG DATA IN BIOMEDICINE

Three Novo Nordisk Foundation (NNF) Challenge Grant recipients (Majken Karoline Jensen, Torben Sigsgaard and Søren Brunak) on the topic of Big Data in Biomedicine are orgnaizing the symposium on the topic of Big Data and Biomedicine on 4-5 September 2023. The first day of symposium is open to everyone discussing and sharing of results from 5 years of research on Big Data in Biomedicine.The second day is intended for the internal project groups to discuss the project results and outcomes in more detail. Take advantage of this exciting opportunity to learn from and network with fellow professionals.
Register here: https://eventsignup.ku.dk/nnfchallengesymposium2023

BERTHA Center at bertha@ph.au.dk

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BERTHA Center is based in the Department of Public Health, Aarhus University and collaborates with the Center for Integrated Register-based Research, Aarhus University (CIRRAU),
Department of Environmental Science, Aarhus University and
Department of Clinical Immunology, Aarhus University Hospital
More on BERTHA at www.bertha.au.dk