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**Testimony on Behalf of the University of Maine in Support of
LD 1601, *Resolve, To Establish an Advisory Panel To Study the Implications of
Genome-editing Technology for the Citizens of the State*
Presented by Benjamin King, Assistant Professor of Bioinformatics, University of Maine
May 4, 2021**

Senator Claxton, Representative Meyer, and other honorable members of the Health and Human Services Committee: My name is Benjamin King and I am an Assistant Professor of Bioinformatics in the Department of Molecular and Biomedical Sciences at the University of Maine. I am testifying on behalf of the University of Maine **in support** of **LD 1601**, *Resolve, To Establish an Advisory Panel To Study the Implications of Genome-editing Technology for the Citizens of the State*.

We should all take pride that Maine is a national leader in biomedical research. For example, UMaine recently created the Institute of Medicine. As part of the Institute, I lead a genetic pilot study of chronic kidney disease (CKD) in collaboration with Northern Light Eastern Maine Medical Center. More than 1 in 7 adults in the US have CKD that can progress to end-stage renal failure. In 2018, nearly 22,000 individuals in Maine on Medicare had CKD and over 1,100 of these individuals were on dialysis. Our study seeks to identify genes that may increase the risk of developing CKD through the study of patients without diabetes, a major risk factor. The university is also part of the Maine INBRE (Institutional Development Award Network for Biomedical Research Excellence) program that seeks to increase Maine's biomedical research capacity and is led by MDI Biological Laboratory. Over the past decade, the program has provided over $68M in funding from the National Institutes of Health to its network of 14 Maine institutions.

Maine is also a national leader in bioinformatics. These methods are required to analyze and interpret increasingly large biological datasets, such as whole genome sequence data from our aforementioned kidney study. Training provided by the Maine INBRE Bioinformatics Core that I co-direct, has trained hundreds of researchers from Maine and beyond. Numerous bioinformatics resources on the biology of the laboratory mouse developed at The Jackson Laboratory are widely used by the world's scientific community. Recently, UMaine collaborated with Northeastern University to offer seed grants to foster inter-institutional research. In my project, we are developing an artificial intelligence-based method to study the immune response to influenza virus infection.

We also have expertise in using genome editing technologies that have accelerated the development of animal models of human disease. For example, my research laboratory uses zebrafish to study the function of the innate immune system in response to influenza virus infection following protocols that have been approved by our Institutional Animal Care and Use Committee. Both the zebrafish and the virus have been genetically engineered to express florescent proteins that allow us to visualize the response in real time. Biomedical researchers like me rely on these animal models to study disease mechanisms. Without the knowledge gained by these studies, we would not be able to develop diagnostic tools or new therapies to treat disease in humans.

Student education at UMaine is at the center of this exciting activity and partnering to prepare the next generation of the in-demand biomedical and bioinformatics workforce whose discoveries and innovations will improve our public and economic health and quality of life in Maine and around the world. For example, the [Graduate School of Biomedical Sciences and Engineering (GSBSE)](#) is a partnership between the University of Maine, The Jackson Laboratory, MDI Biological Laboratory, Maine Medical Research Center Research Institute, and the University of New England. The GSBSE offers Ph.D. programs in Biomedical Science and Biomedical Engineering, and a Professional Science Master's program in Bioinformatics. We have 75 current students, 195 faculty and 71 alumni, including myself. [My department](#) also offers graduate programs in Microbiology, and Biochemistry and Molecular Biology. A new 4+1 Master's program in bioinformatics was established together with Northeastern's Roux Institute.

The ethical, legal and social implications of genome editing are complex and interdisciplinary. Strategic public and private investments in biomedical research and education, including in ethical, legal and social implications, would further reinforce Maine's leadership role in genetics and biomedical research. The advisory panel proposed by LD 1601 would elevate what is already happening in Maine and better position the state to avoid the hazards of genome editing technology and capitalize on the potential of the technology in the future. For this reason, this resolve has the support of Maine's public research university.

While we defer to this Committee on the final makeup of the advisory panel, as I hope my testimony today makes clear, the University of Maine has both great knowledge and interest relevant to its responsibilities, including in bioethics and genetic improvement related to our heritage industries like fishing and farming. We welcome the opportunity to both serve on the panel and to provide additional technical expertise as necessary to inform its work.

Thank you for your consideration. I would be happy to answer any questions.

Sincerely,

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