

Persistent homology analysis distinguishes pathological bone
microstructure in non-linear microscopy images: Supplemental
Information

**Ysanne Pritchard^{1,*}, Aikta Sharma^{4,6}, Claire Clarkin⁴, Helen Ogden^{1,3,5}, Sumeet
Mahajan^{2,3,+}, and Rubén J. Sánchez-García^{1,3,5,+}**

¹School of Mathematical Sciences, University of Southampton, Southampton, SO17 1BJ, UK

²School of Chemistry, University of Southampton, School of Chemistry, Southampton, SO17 1BJ, UK

³Institute for Life Sciences, University of Southampton, Southampton, SO17 1BJ, UK

⁴School of Biological Sciences, University of Southampton, Southampton, SO17 1BJ, UK

⁵The Alan Turing Institute, London, NW1 2DB, UK

⁶Mechanical Engineering, University College London, London, WC1E 7JE, UK

*ysanne.pritchard@soton.ac.uk

+these authors contributed equally to this work

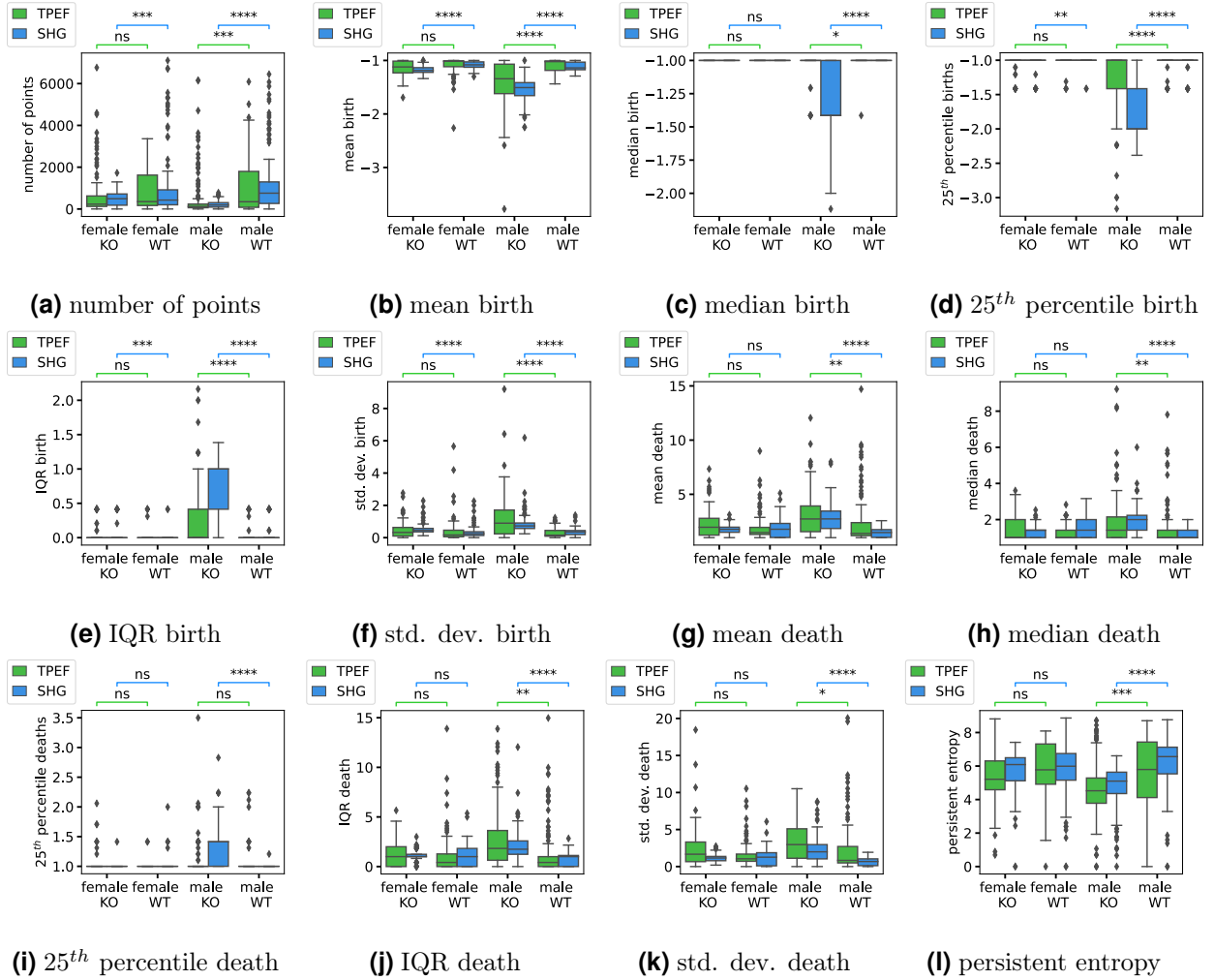


Figure S1. Box plots of persistence statistics from quadrant 2 of H_0 per image patch, which summarise the micro-holes. The box plots show the median and quartiles, with outliers marked as points outside of 1.5 times the interquartile range. We annotate their significance using the adjusted p -values for four comparisons (male OcnVEGFKO v. male WT, female OcnVEGFKO v. female WT, male OcnVEGFKO v. male WT, female OcnVEGFKO v. female WT) on each imaging type (TPaF or SHG). Here the stars indicate significance levels: ‘ns’ is not significant $0.05 < p \leq 1$, ‘*’ $0.01 < p \leq 0.05$, ‘**’ $0.001 < p \leq 0.01$, ‘***’ $0.0001 < p \leq 0.001$, and ‘****’ $p \leq 0.0001$. We include only four of eight significance annotations for readability. Std. dev. is the standard deviation and IQR is the interquartile range.

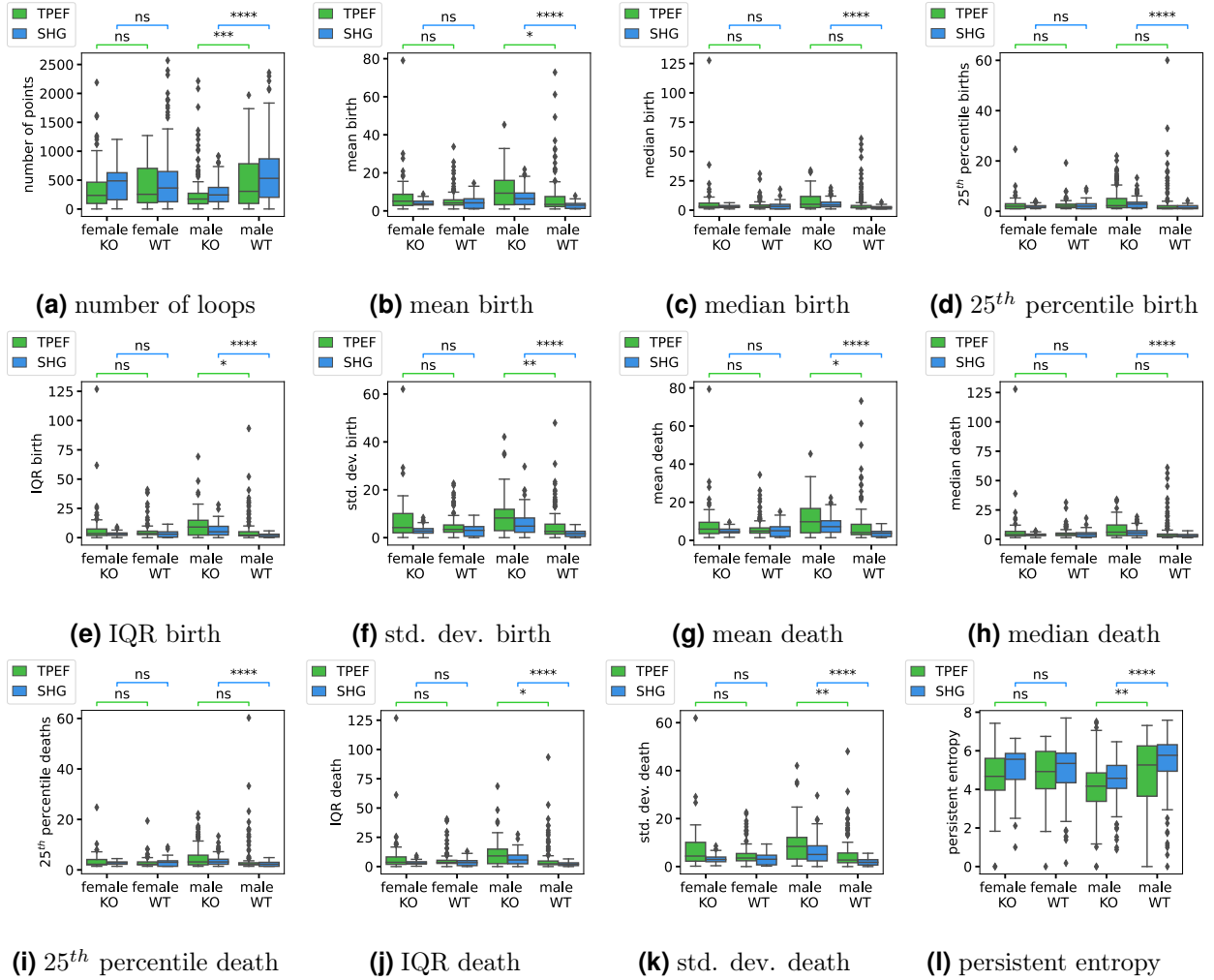


Figure S2. Box plots of persistence statistics from quadrant 1 of H_1 per image patch, which summarise the loops in the filtration that are regions of bone surrounded by micro-holes. The box plots show the median and quartiles, with outliers marked as points outside of 1.5 times the interquartile range. We annotate their significance using the adjusted p -values for four comparisons (male OcnVEGFKO v. male WT, female OcnVEGFKO v. female WT, male OcnVEGFKO v. male WT, female OcnVEGFKO v. female WT) on each imaging type (TPaF or SHG). Here the stars indicate significance levels: ‘ns’ is not significant $0.05 < p \leq 1$, ‘*’ $0.01 < p \leq 0.05$, ‘**’ $0.001 < p \leq 0.01$, ‘***’ $0.0001 < p \leq 0.001$, and ‘****’ $p \leq 0.0001$. We include only four of eight significance annotations for readability. Std. dev. is the standard deviation and IQR is the interquartile range.