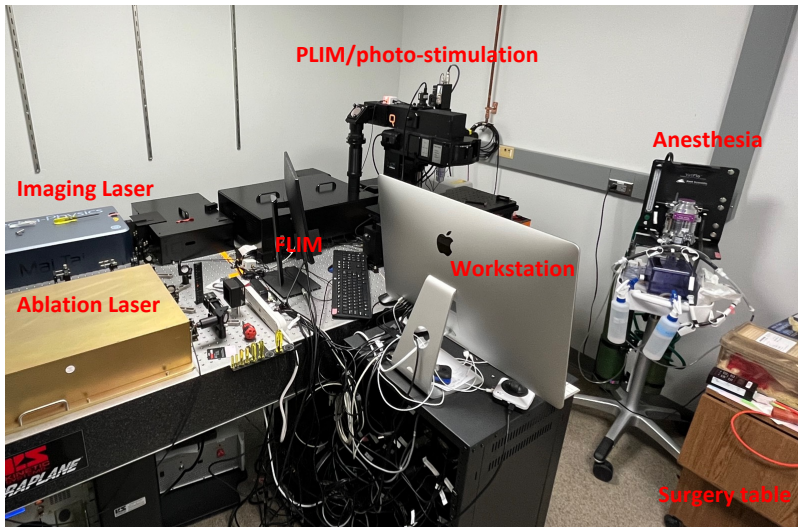
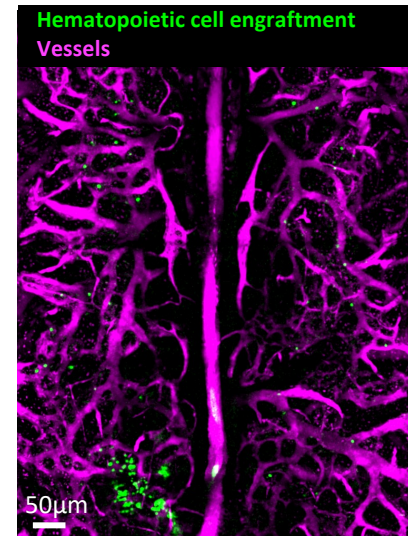


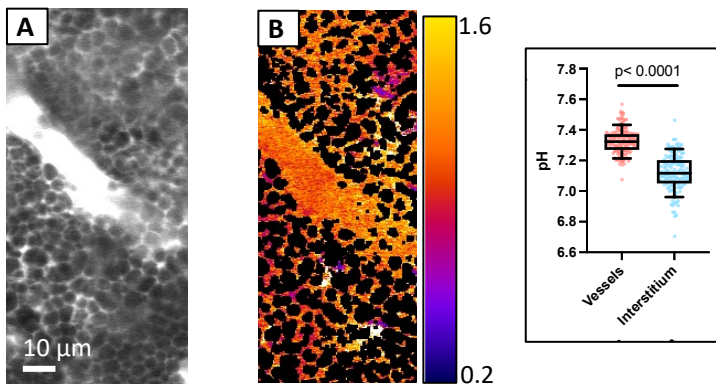
Intravital Multiphoton Imaging and Manipulation



Spatiotemporal tracking of rare cells



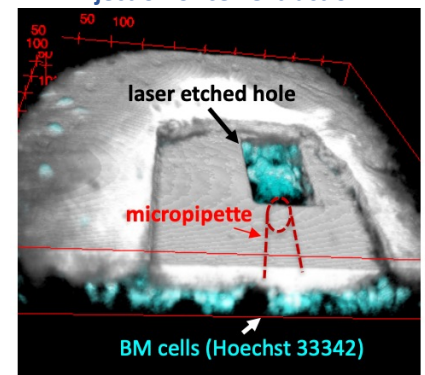
Quantification of interstitial calcium/pH at single cell resolution [1]



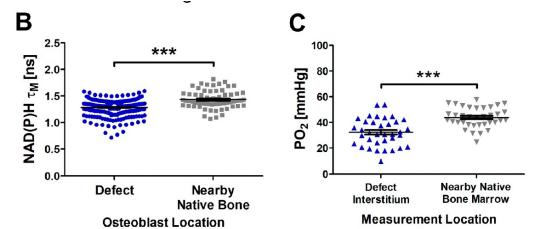
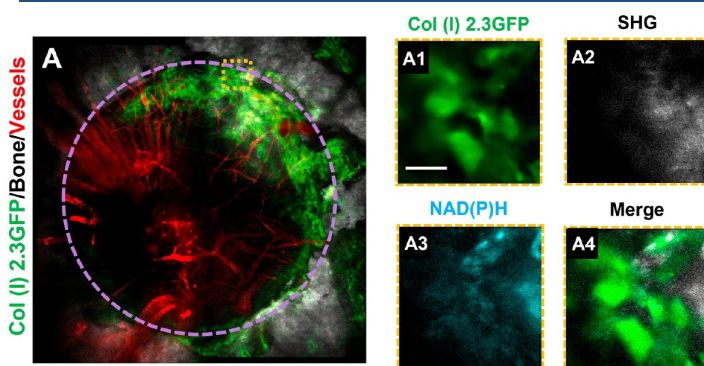
- (A) Intravenous delivery of cell impermeable, fluorescent pH or calcium probes that fill in the extracellular space of the bone marrow.
 (B) Ratiometric map and conversion to absolute pH based on calibration curves.

Plasma-mediated laser ablation and micromanipulation [2]

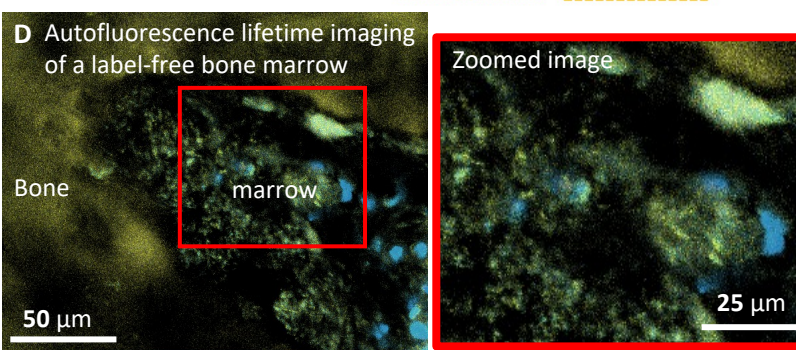
bone etching for micro-orthotopic injection or cell extraction



Fluorescence and phosphorescence lifetime measurements in vivo [3,4]



- (A) 1 mm cranial defect with bone, osteoblast, and vasculature visualized intravital two-photon imaging.
 (B) In vivo fluorescence lifetime of NAD(P)H from osteoblasts
 (C) In vivo phosphorescence lifetime measurements for direct quantification of pO₂.
 (D) Autofluorescence lifetime of bone lining populations and hematopoietic cells from a label-free bone marrow



References

- [1] Yeh SCA, Hou J et al, *Nat Comm*, 13(1):393, 2022
 [2] Haase C. et al, *Nat Methods*, 19(12):1622-1633, 2022
 [3] Schilling K, Zhai Y et al, *Elife*, 11:e83146, 2022
 [4] Schilling K, Brown E, and Zhang X, *Bone*, 116257, 2021