

SUPPORTING INFORMATION

Super-resolution reconstruction for two and three-dimensional LA-ICP-MS bio-imaging

Mika T. Westerhausen^a, David P. Bishop^a, Annette Dowd^b, Jonathan Wanagat^c, Nerida Cole^d & Philip A. Doble^{a*}

- a. The Atomic Medicine Initiative, School of Mathematical and Physical Sciences, University of Technology Sydney, Broadway, NSW, 2007, Australia
- b. School of Mathematical and Physical Sciences, University of Technology Sydney, Broadway NSW, 2007, Australia
- c. Department of Medicine, Division of Geriatrics, David Geffen School of Medicine, University of California, Los Angeles, CA, USA
- d. Faculty of Science, Engineering & Technology Swinburne University of Technology, John Street, Hawthorn, Victoria, 3122, Australia

TABLE OF CONTENTS

Table S1: Concentrations of gelatin standards.....	2
Table S2: Concentrations of aqueous standards.....	2
Table S3: Analytical figures of merit after application of the processing algorithms.	3
Table S4: Average Response and % RSD for calibration standard near or above the LOQ.	3
Table S5: Average concentrations and % RSD for simulated two-layer sample.....	4
Figure S1: Representative calibration curves and image panels.....	5
Figure S2: Post ablation raster pattern.....	6
Figure S3: Effect of image processing on two-layer test.....	Error! Bookmark not defined.

Table S1: Concentrations of gelatin standards.

Standard	Gd (ng.g⁻¹)
Blank	1.3±0.1
1	16.2±0.2
2	61.2±0.4
3	241.0±2
4	893.0±5
5	3523.0±14

Table S2: Concentrations of aqueous standards.

Standard	Gd (ng.g⁻¹)
Blank	0.00
1	0.29
2	1.17
3	4.69
4	18.8
5	75.0
6	300

Table S3: Analytical figures of merit after application of the processing algorithms.

	Gradient (CPS/ng.g⁻¹)	Intercept (CPS)	Linearity (r²)	LOD (ng.g⁻¹)	LOQ (ng.g⁻¹)
Horizontal	0.1433	2.4	0.9996	72	219
Vertical	0.1237	2.0	0.9994	82	248
Summed	0.2670	4.4	0.9995	77	234
SRR	0.2659	12.1	0.9993	89	270
Gaussian	0.2657	12.1	0.9993	91	275
RLTV	0.2673	11.3	0.9993	94	285

Table S4: Average Response and % RSD for calibration standard near or above the LOQ.

	Standard 4	
	Average Response (CPS)	%RSD
Summed	86	44
SRR	93	36
Gaussian	93	24
RLTV	92	36
	Standard 5	
	Average Response (CPS)	%RSD
Summed	221	31
SRR	230	24
Gaussian	230	16
RLTV	228	26
	Standard 6	
	Average Response (CPS)	%RSD
Summed	897	23
SRR	952	14
Gaussian	952	11
RLTV	958	20

Table S5: Average concentrations and % RSD for simulated two-layer sample.

Layer	Gd (ng.g⁻¹)	% RSD
Horizontal	690	110
Vertical	690	110
Summed	690	110
SRR	756	70
Gaussian	756	58
RLTV	772	86

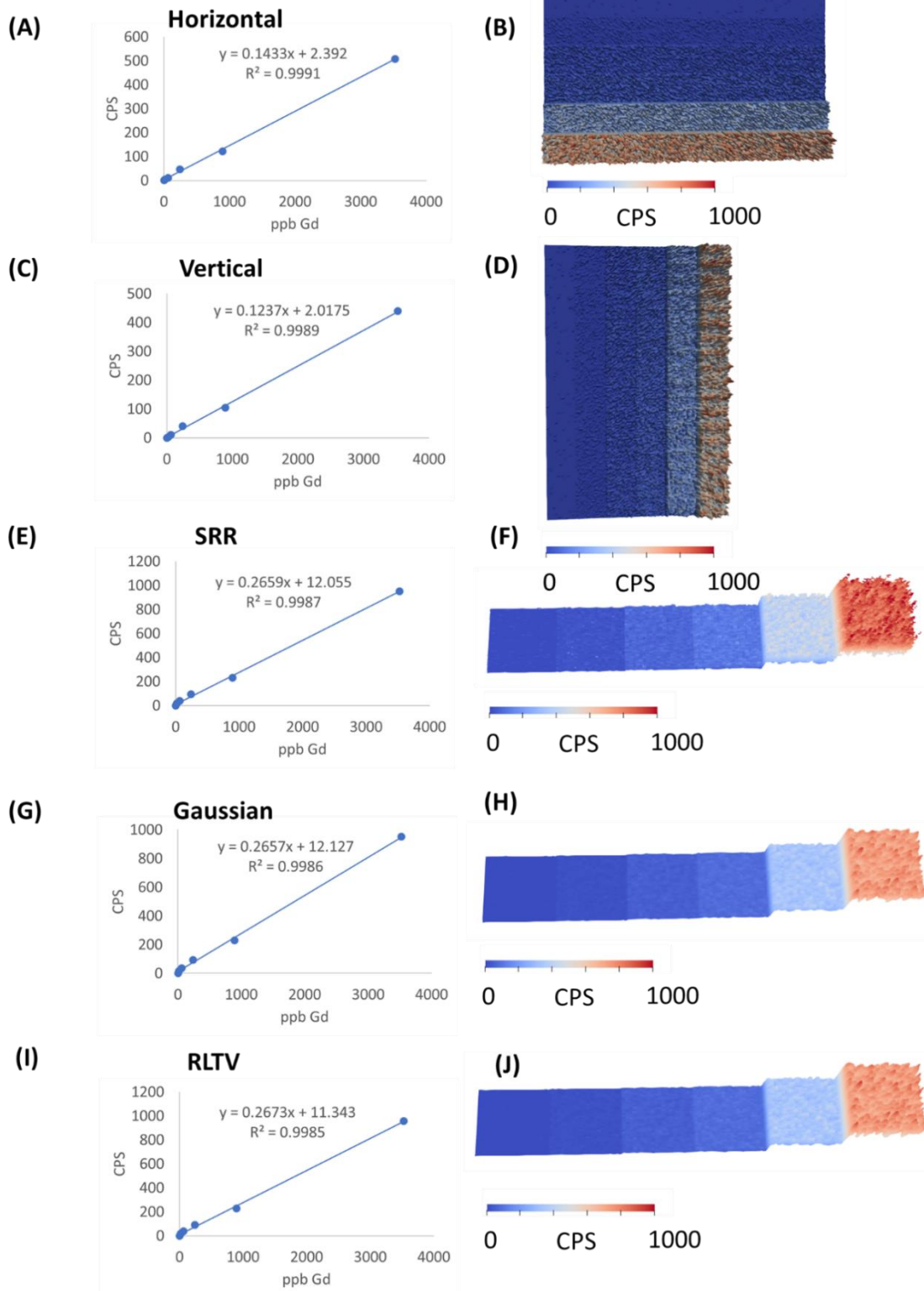


Figure S1: Representative calibration curves and image panels. (A) Anisotropic single layer calibration curve in horizontal direction. (B) Image of calibration standards in horizontal direction. (C) Anisotropic single layer calibration curve in vertical direction. (D) Image of calibration standards in vertical direction. (E) Calibration curve after SRR with AR = 2. (F) Image of calibration standards after SRR. (G) Calibration curve after application of the Gaussian filter. (H) Image of calibration standards after Gaussian filter. (I) Calibration curve after RLTV. (J) Image of calibration standards after RLTV.

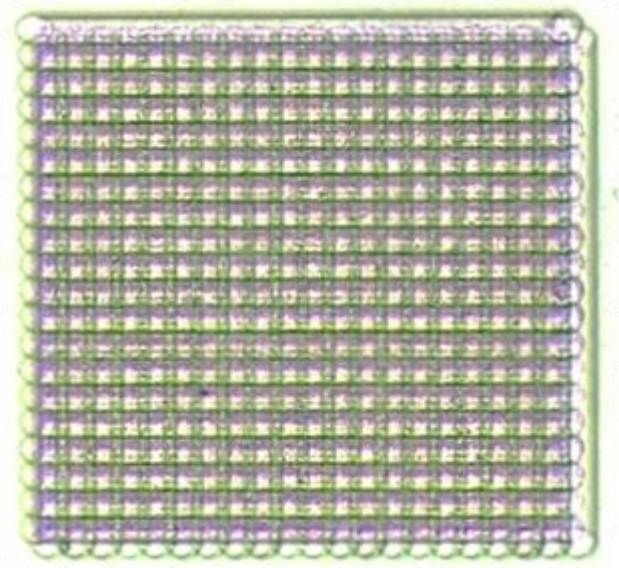


Figure S2: Post-ablation raster pattern after two passes in the horizontal and vertical directions.

Two-layer test
AR 2 - 7.5 μm
Speed 2x

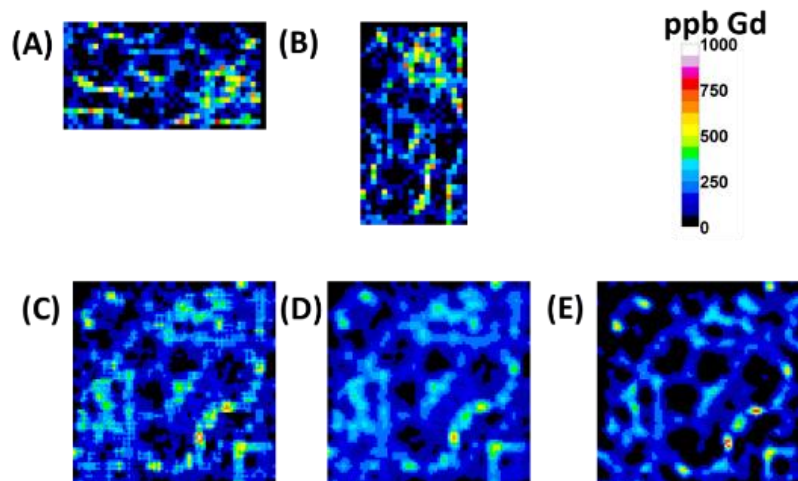


Figure S3: Effect of image processing on two-layer test. (A) Anisotropic acquisition of single layer in horizontal direction. (B) Same layer as (A), transposed to vertical direction. (C) SRR of (A) and (B). (D) Application of Gaussian filter. (E) RTLV image.