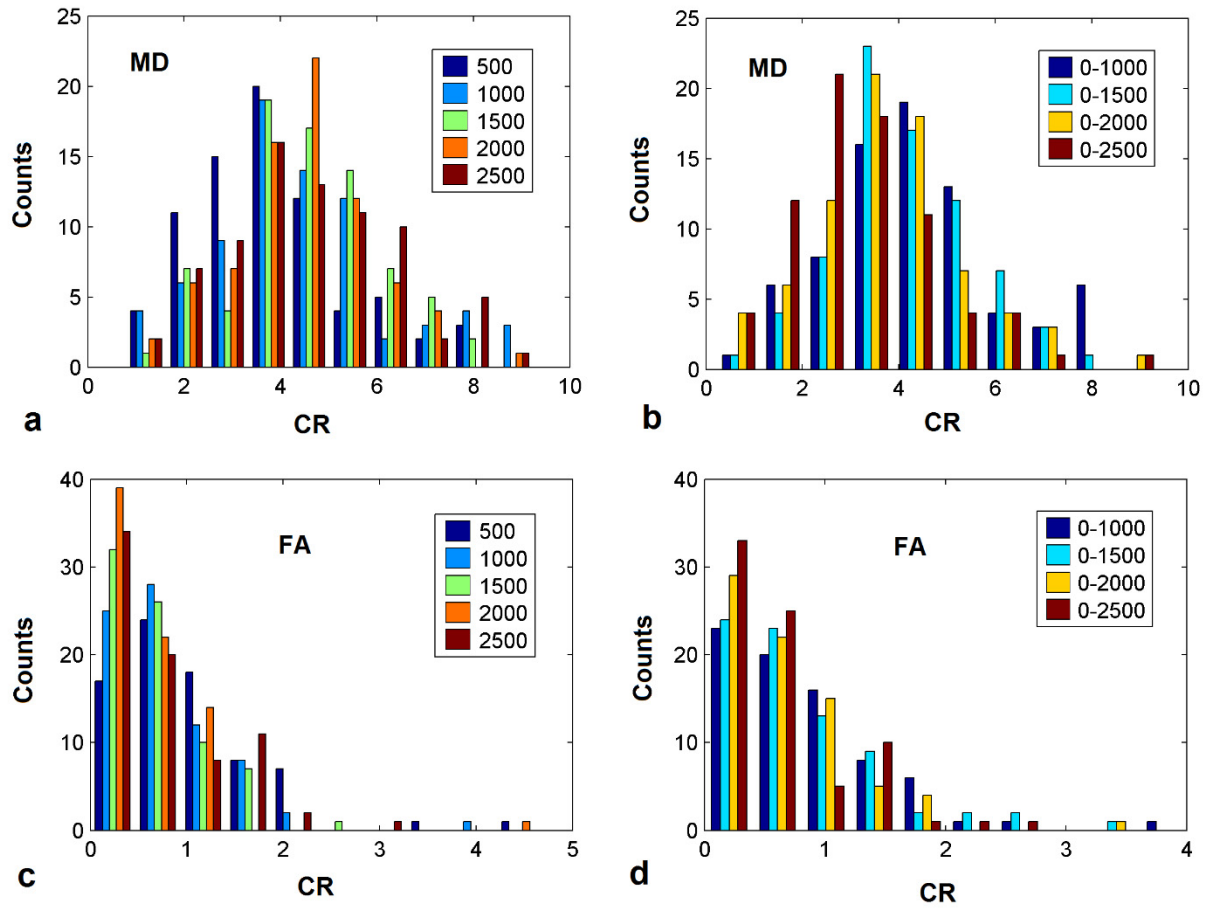


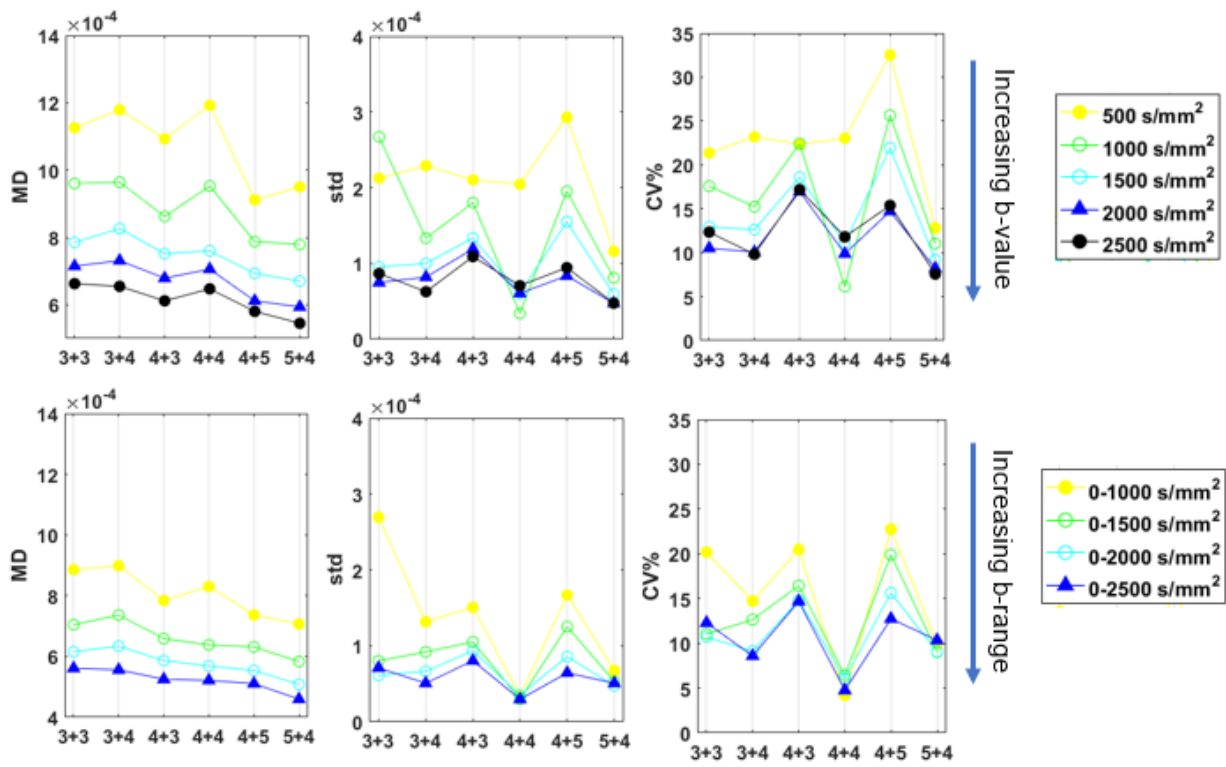
## Supplementary Information



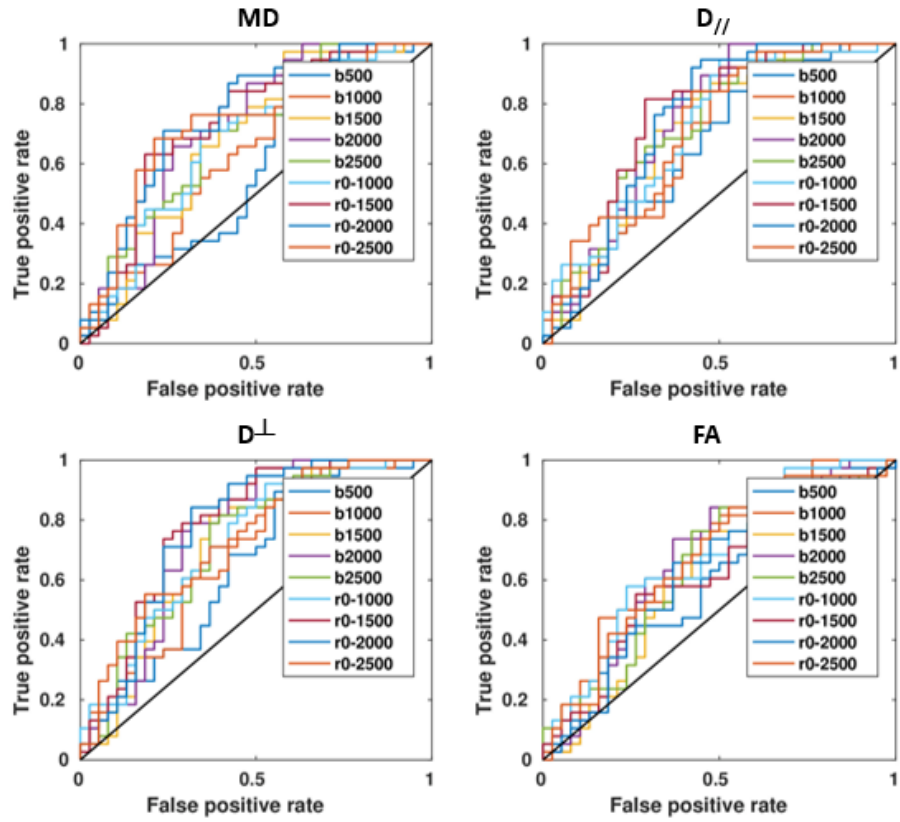
**Figure S1. Contrast ratio (CR) of MD and FA between benign and cancerous tissue in the patients' cohort.** Histograms of CR computed in MD and FA maps at different b-values (a,c) and b-value ranges (b,d). Most of the lesions are better visualized in MD maps obtained at  $b=2000$  s/mm<sup>2</sup> while FA maps offer poor contrast, regardless of the b-value, as indicated by histograms skewed to the left.

**Table S1. The area under the curve (AUC), specificity (Sp), and sensibility (Se) obtained from ROC curve analysis for the classification of benign and PCa tissue.**

<b>b-value (s/mm<sup>2</sup>)</b>	<b>MD</b>			<b>D//</b>			<b>D<sup>⊥</sup></b>			<b>FA</b>		
	<b>AUC</b>	<b>Sp</b>	<b>Se</b>	<b>AUC</b>	<b>Sp</b>	<b>Se</b>	<b>AUC</b>	<b>Sp</b>	<b>Se</b>	<b>AUC</b>	<b>Sp</b>	<b>Se</b>
500	1	1	0.97	1	0.97	0.99	1	0.97	1	0.84	0.7	0.86
1000	1	0.99	1	0.99	1	0.97	0.99	1	0.99	0.75	0.84	0.55
1500	1	1	1	1	1	1	1	1	1	0.7	0.79	0.57
2000	1	0.97	1	1	0.97	1	1	0.97	1	0.67	0.86	0.5
2500	1	0.99	0.99	1	0.96	1	1	0.96	1	0.8	0.87	0.62
<b>b-value range (s/mm<sup>2</sup>)</b>	<b>MD</b>			<b>D//</b>			<b>D<sup>⊥</sup></b>			<b>FA</b>		
	<b>AUC</b>	<b>Sp</b>	<b>Se</b>	<b>AUC</b>	<b>Sp</b>	<b>Se</b>	<b>AUC</b>	<b>Sp</b>	<b>Se</b>	<b>AUC</b>	<b>Sp</b>	<b>Se</b>
0-1000	1	1	0.97	0.98	0.99	0.99	0.98	0.99	0.99	0.75	0.64	0.75
0-1500	1	0.99	1	1	0.99	1	1	0.99	1	0.64	0.33	0.89
0-2000	0.99	0.96	1	0.99	0.97	1	0.99	0.97	1	0.58	0.93	0.25
0-2500	0.98	0.91	1	0.98	0.97	0.95	0.98	0.96	0.96	0.6	0.87	0.36



**Figure S2. Variability of MD estimate in PCa lesions.** MD was averaged over groups of lesions sharing the same Gleason Score, GS (a,d). Mean MD values and their standard deviations (b,e) are plotted towards b-values and b-ranges. The last column (c,f) shows the coefficient of variation, CV%. The legend indicates different b-values and b-value ranges.



**Figure S3. ROC curves.** Diagnostic ability of DTI metrics (MD=mean diffusivity, D<sub>//</sub>=axial diffusivity, D<sub>⊥</sub>=radial diffusivity, FA=fractional anisotropy) in the discrimination between PCa lesions with low- vs high-Gleason grade, for each b-value (ranging from 500 to 2500 s/mm<sup>2</sup>) and b-value range (0-1000 to 0-2500 s/mm<sup>2</sup>).

Table S2. Pearson's correlation (r) between DTI parameters and GS for each considered b-value and b-value range (adjusted P = 0.0014; significant correlations are highlighted in bold).

b-value (s/mm <sup>2</sup> )	MD		D//		D <sup>⊥</sup>		FA	
	r	P	r	P	r	P	r	P
500	-0.25	0.03	-0.33	0.003	-0.32	0.004	-0.13	0.3
1000	-0.30	0.008	-0.35	0.005	-0.33	0.003	-0.19	0.1
1500	-0.34	0.003	-0.35	0.002	-0.39	<b>0.0006</b>	-0.12	0.3
2000	-0.43	<b>0.0001</b>	-0.45	<b>&lt; 0.0001</b>	-0.48	<b>&lt; 0.0001</b>	-0.21	0.07
2500	-0.39	<b>0.0006</b>	-0.42	<b>0.0002</b>	-0.44	<b>&lt; 0.0001</b>	-0.25	0.03
b-value range (s/mm <sup>2</sup> )	MD		D//		D <sup>⊥</sup>		FA	
	r	P	r	P	r	P	r	P
0-1000	-0.32	0.004	-0.33	0.004	-0.34	0.003	-0.24	0.04
0-1500	-0.38	<b>0.0007</b>	-0.39	<b>0.0005</b>	-0.45	<b>&lt; 0.0001</b>	-0.19	0.1
0-2000	-0.42	<b>&lt; 0.0001</b>	-0.43	<b>&lt; 0.0001</b>	-0.48	<b>&lt; 0.0001</b>	-0.18	0.1
0-2500	-0.40	<b>0.0003</b>	-0.44	<b>&lt; 0.0001</b>	-0.46	<b>&lt; 0.0001</b>	-0.27	0.02