$$\tilde{x}^{w}_{eff,s|p} = \text{Prob}(\text{X}_{\text{eff}} = \hat{x}^{w}_{eff,s} \mid P = p) = \frac{\text{Prob}_{P,X_{eff}}(p, \hat{x}^{w}_{eff,s})}{\text{Prob}_{\text{P}}(p)}$$

13. The program carrier device of claim 11, wherein a longest axis of each fracture plane is read and designated as the effective fracture length for each respective fracture plane.

14. The program carrier device of claim 11, wherein the average effective fracture length for each fracturing stage is calculated by:

$$\hat{x}^{w}_{eff,s} = \frac{1}{F}\sum_{f=1}^{F} x^{w}_{eff,s,f}$$

15. The program carrier device of claim 11, wherein each reservoir or well-log property is a complex reservoir property.

16. The program carrier device of claim 11, wherein each fracturing stage for each well comprises a plurality of fracture planes, each fracture plane within a respective fracturing stage having a different effective fracture length.

17. A method for optimizing well production in a simulated reservoir volume, which comprises:

inputting one or more complex reservoir properties and one or more complex fracture network properties, the complex fracture network properties comprising data corresponding to clusters in a complex fracture network model;

determining a distribution of average effective fracture lengths by:

reading an effective fracture length for each fracture plane in each fracturing stage for each well;

calculating an average effective fracture length for each fracturing stage using each effective fracture length for a respective fracturing stage; and

building the distribution of average effective fracture lengths by correlating the average effective fracture length for each respective fracturing stage with each reservoir or well-log property;

sampling the average effective fracture length from the distribution of average effective fracture lengths; and

optimizing well production by history matching using the distribution of average effective fracture lengths and the sampled average effective fracture length.

18. The method of claim 17, wherein the distribution of average effective fracture lengths is a discrete conditional distribution that is built by:

$$\tilde{x}^{w}_{eff,s|p} = \text{Prob}(\text{X}_{\text{eff}} = \hat{x}^{w}_{eff,s} \mid P = p) = \frac{\text{Prob}(P = p \cap \text{X}_{\text{eff}} = \hat{x}^{w}_{eff,s})}{\text{Prob}(P = p)}$$

or a continuous conditional distribution that is built by:

$$\tilde{x}^{w}_{eff,s|p} = \text{Prob}(\text{X}_{\text{eff}} = \hat{x}^{w}_{eff,s} \mid P = p) = \frac{\text{Prob}_{P,\text{X}_{\text{eff}}}(p, \hat{x}^{w}_{eff,s})}{\text{Prob}_{\text{P}}(p)}$$

19. The method of claim 17, wherein a longest axis of each fracture plane is read and designated as the effective fracture length for each respective fracture plane.

20. The method of claim 17, wherein the average effective fracture length for each fracturing stage is calculated by:

$$\hat{x}^{w}_{eff,s} = \frac{1}{F}\sum_{f=1}^{F} x^{w}_{eff,s,f}$$

$$\tilde{x}^{w}_{eff,s|p} = \text{Prob}(\text{X}_{\text{eff}} = \hat{x}^{w}_{eff,s} \mid P = p) = \frac{\text{Prob}_{P,X_{\text{eff}}}(p, \hat{x}^{w}_{eff,s})}{\text{Prob}_{\text{P}}(p)}$$

13. The program carrier device of claim 11, wherein a longest axis of each fracture plane is read and designated as the effective fracture length for each respective fracture plane.

14. The program carrier device of claim 11, wherein the average effective fracture length for each fracturing stage is calculated by:

$$\hat{x}^{w}_{eff,s} = \frac{1}{F}\sum_{f=1}^{F} x^{w}_{eff,s,f}$$

15. The program carrier device of claim 11, wherein each reservoir or well-log property is a complex reservoir property.

16. The program carrier device of claim 11, wherein each fracturing stage for each well comprises a plurality of fracture planes, each fracture plane within a respective fracturing stage having a different effective fracture length.