

SUPPLEMENTAL MATERIAL

SUPPLEMENTAL TABLE S1—*Sensitivity and reproducibility. (a) Summary contributor distribution statistics (rows) are shown in ban units for different numbers of observed contributors (columns). The log(LR) values are for genotype comparisons to true contributors, measuring average and extreme values, along with standard deviation (std dev). The last row measures reproducibility as the within-group standard deviation (σ_w) for match statistics from replicate computer runs for a contributor derived from the same mixture. (b) The number of contributor negative log(LR) values is shown for different numbers of observed contributors (columns). Values are grouped by integer-valued log(LR) bins (rows).*

(a) Summary statistics

Comparisons	Observed contributor number				
	2	3	4	5	6
	6	6	8	40	18
minimum	6.64	1.64	4.83	-0.39	-1.06
mean	23.21	15.38	9.39	6.26	5.23
median	26.75	13.56	9.02	4.84	2.45
maximum	29.02	28.73	14.81	27.58	26.41
std dev	8.57	11.09	3.51	5.02	7.72
σ_w	0.17	0.88	0.36	0.87	1.00

(b) Contributor negative events

log(LR)	Observed contributor number				
	2	3	4	5	6
-2	0	0	0	0	1
-1	0	0	0	1	1
Total	0	0	0	1	2

SUPPLEMENTAL TABLE S2—*Specificity. Evidence and non-contributor genotypes were compared for different numbers of observed contributors (columns). Table (a) shows summary log(LR) statistics for the distributions (rows). Table (b) shows non-contributor positive cumulative probability, binned by log(LR) value (rows).*

(a) Summary statistics

	Observed contributor number				
	2	3	4	5	6
Comparisons	120,000	120,000	160,000	800,000	360,000
minimum	-44	-44	-31.70	-44	-44
mean	-33.05	-21.55	-10.53	-9.91	-13.24
median	-36.05	-19.29	-10.21	-7.94	-11.08
maximum	0.61	3.76	3.65	5.34	4.62
99.90%	-4.40	0.64	0.99	1.60	1.45
99.99%	-1.46	2.18	2.67	2.78	2.45
std dev	9.57	11.61	4.56	7.66	10.07

(b) Non-contributor positive cumulative probability

log(LR)	Observed contributor number				
	2	3	4	5	6
≥ 0	0.000008	0.002083	0.003131	0.009283	0.011719
≥ 1	0	0.000583	0.000981	0.002661	0.002375
≥ 2	0	0.000133	0.000275	0.000478	0.000292
≥ 3	0	0.000017	0.000069	0.000070	0.000031
≥ 4	0	0	0	0.000021	0.000003
≥ 5	0	0	0	0.000001	0

SUPPLEMENTAL TABLE S3—DNA amount specificity. Non-contributor distribution described at different DNA amounts (columns) for five contributor mixtures. (a) Center, spread, and extreme log(LR) values. (b) Positive counts are binned by integer log(LR) (left column). (c) Cumulative probabilities are binned by integer log(LR) (left column). The number of comparisons (a, first row) is the same across all tables.

(a) Summary statistics

	DNA amount (pg)				
	0 – 25	25 – 75	75 – 150	150 – 250	250 – 500
Comparisons	30,000	200,000	490,000	60,000	20,000
minimum	-24.45	-36.65	-38.71	-42.06	-44.00
mean	-5.85	-8.55	-8.82	-22.92	-37.01
median	-4.47	-7.82	-7.83	-24.19	-37.35
maximum	3.27	4.31	5.34	1.65	-19.74
99.90%	1.62	1.67	1.60	-1.49	-23.55
99.99%	2.60	2.72	2.90	0.55	-19.90
std dev	3.95	5.02	5.35	7.56	3.73

(b) Non-contributor positive events

log(LR)	DNA amount (pg)				
	0 – 25	25 – 75	75 – 150	150 – 250	250 – 500
0	124	1589	3352	12	0
1	55	508	1086	4	0
2	14	91	203	0	0
3	2	7	29	0	0
4	0	3	13	0	0
5	0	0	1	0	0
Total	195	2,198	4,684	16	0

(c) Non-contributor positive cumulative probability

log(LR)	DNA amount (pg)				
	0 – 25	25 – 75	75 – 150	150 – 250	250 – 500
≥ 0	0.006500	0.010990	0.009559	0.000267	0
≥ 1	0.002367	0.003045	0.002718	0.000067	0
≥ 2	0.000533	0.000505	0.000502	0	0
≥ 3	0.000067	0.000050	0.000088	0	0
≥ 4	0	0.000015	0.000029	0	0
≥ 5	0	0	0.000002	0	0

SUPPLEMENTAL TABLE S4—Contributors sensitivity. The effect on contributor distribution sensitivity of using observed or designed numbers of contributors. (a) Summary log(LR) statistics for the distributions formed under the different contributor assumptions (columns). (b) A Kolmogorov-Smirnov (K-S) statistical comparison of the two distributions.

(a) Summary statistics

	Observed	Designed
Comparisons	62	62
minimum	-1.06	-1.57
mean	7.09	7.17
median	4.82	5.33
maximum	29.02	29.05
standard deviation	7.64	6.35
negative values	3	3

(b) Distribution comparison

K-S statistic	0.1613
p-value	0.37
σ_w	1.39

SUPPLEMENTAL TABLE S5—Contributors specificity. The effect on the non-contributor distribution specificity of using observed or designed numbers of contributors. (a) Summary statistics show center, spread, and extreme $\log(LR)$ values. (b) Cumulative probability is binned by integer $\log(LR)$.

(a) Summary statistics

	Observed	Designed
Comparisons	1,560,000	2,160,000
minimum	-44	-44
mean	-13.41	-10.21
median	-9.94	-7.14
maximum	5.34	4.78
99.90%	1.43	1.66
99.99%	2.65	2.70
std dev	10.72	9.33

(b) Non-contributor positive cumulative probability

$\log(LR)$	Observed	Designed
≥ 0	0.007947	0.015901
≥ 1	0.002058	0.003506
≥ 2	0.000351	0.000498
≥ 3	0.000051	0.000051
≥ 4	0.000012	0.000007
≥ 5	0.000001	0

SUPPLEMENTAL TABLE S6—*Peeling specificity. Tables compare genotype information, with and without peeling, using non-contributor distributions. (a) Summary statistics show center, spread, and extreme log(LR) distribution values. (b) Cumulative probability is binned by log(LR).*

(a) Summary statistics

	Without Peeling	With Peeling
Comparisons	200,000	200,000
minimum	-18.97	-35.67
mean	-3.26	-5.91
median	-3.01	-4.82
maximum	3.30	5.50
99.90%	1.96	1.73
99.99%	2.78	3.31
std dev	2.37	4.80

(b) Non-contributor positive cumulative probability

log(LR)	Without Peeling	With Peeling
≥ 0	0.058165	0.021895
≥ 1	0.009700	0.004495
≥ 2	0.000940	0.000560
≥ 3	0.000045	0.000135
≥ 4	0	0.000030
≥ 5	0	0.000010

SUPPLEMENTAL TABLE S7—*Sampling sensitivity. For each observed contributor number (rows), the effect of sampling duration (columns) on contributor distribution is summarized. The log(LR) statistical measures are distribution mean and standard deviation (std dev).*

		Sampling time (thousands of cycles)									
		5K		10K		25K		50K		100K	
		mean	std dev	mean	std dev	mean	std dev	mean	std dev	mean	std dev
Contributors	2	23.37	7.71	23.13	8.65	23.50	8.37	22.88	9.30	23.21	8.57
	3	10.89	13.41	17.22	10.29	17.15	10.58	15.98	11.02	15.38	11.09
	4	8.50	3.12	8.53	4.46	8.49	4.56	9.42	3.93	9.39	3.51
	5	4.76	5.62	5.60	5.68	6.33	5.55	6.61	5.14	6.26	5.02
	6	2.44	6.33	4.45	6.98	5.77	7.05	5.04	7.70	5.23	7.72

SUPPLEMENTAL TABLE S8—*Sampling specificity. The tables show how sampling duration affects the non-contributor distribution when five contributors are observed. (a) Summary statistics show center, spread, and extreme log(LR) values. (b) Cumulative probability is binned by integer log(LR).*

(a) Summary statistics

	Sampling time (thousands of cycles)				
	5K	10K	25K	50K	100K
Comparisons	400,000	400,000	400,000	400,000	400,000
minimum	-43.30	-42.90	-44.00	-44.00	-44.00
mean	-17.07	-14.04	-11.17	-9.95	-9.73
median	-16.61	-13.10	-9.82	-8.19	-7.86
maximum	3.70	3.97	4.64	5.12	4.94
99.90%	1.01	1.19	1.53	1.68	1.57
99.99%	2.14	2.24	2.61	2.73	2.84
std dev	8.61	8.26	7.71	7.35	7.42

(b) Non-contributor positive cumulative probability

log(LR)	Sampling time (thousands of cycles)				
	5K	10K	25K	50K	100K
≥ 0	0.003855	0.005605	0.012220	0.010123	0.009323
≥ 1	0.001008	0.001360	0.002718	0.002883	0.002600
≥ 2	0.000130	0.000208	0.000408	0.000523	0.000478
≥ 3	0.000018	0.000015	0.000050	0.000058	0.000075
≥ 4	0	0	0.000008	0.000010	0.000023
≥ 5	0	0	0	0.000003	0.000023