

Supplementary Material

A Two-Stage Reconstruction of Microstructures with Arbitrarily Shaped Inclusions

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Table S1. Shape libraries to Example_1.





























| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|--|---|
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |



| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|---|---|
| 13 |  |  |  |  |
| 14 |  |  |  |  |
| 15 |  |  |  |  |
| 16 |  |  |  |  |
| 17 |  |  |  |  |
| 18 |  |  |  |  |
| 19 |  |  |  |  |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|---|---|
| 20 |  |  |  |  |
| 21 |  |  |  |  |
| 22 |  |  |  |  |
| 23 |  |  |  |  |
| 24 |  |  |  |  |
| 25 |  |  |  |  |
| 26 |  |  |  |  |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|---|---|
| 27 |  |  |  |  |
| 28 |  |  |  |  |
| 29 |  |  |  |  |
| 30 |  |  |  |  |
| 31 |  |  |  |  |
| 32 |  |  |  |  |
| 33 |  |  |  |  |



Cluster #

Target

Seed 1

Seed 2

34



35



36



37



38































39



40



| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|---|---|
| 41 |  |  |  |  |
| 42 |  |  |  |  |
| 43 |  |  |  |  |
| 44 |  |  |  |  |
| 45 |  |  |  |  |
| 46 |  |  |  |  |
| 47 |  |  |  |  |



Cluster #

Target

Seed 1

Seed 2

48



49



50



51



52































53



54



| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 55 | ↙ | ↘ | ↗ | ↖ |
| 56 | ↖ | ↗ | ↘ | ↙ |
| 57 | ↗ | ↖ | ↙ | ↘ |
| 58 | ↘ | ↙ | ↖ | ↗ |
| 59 | ↖ | ↗ | ↘ | ↙ |
| 60 | ↗ | ↖ | ↙ | ↘ |
| 61 | ↘ | ↙ | ↖ | ↗ |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|---|---|
| 62 |  |  |  |  |
| 63 |  |  |  |  |
| 64 |  |  |  |  |
| 65 |  |  |  |  |
| 66 |  |  |  |  |
| 67 |  |  |  |  |
| 68 |  |  |  |  |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 69 | ■ | ■ | ■ | ■ |
| 70 | ■ | ■ | ■ | ■ |
| 71 | ■ | ■ | ■ | ■ |
| 72 | ■ | ■ | ■ | ■ |
| 73 | ■ | ■ | ■ | ■ |
| 74 | ■ | ■ | ■ | ■ |
| 75 | ■ | ■ | ■ | ■ |



Cluster #

Target

Seed 1

Seed 2

76

■

■

■

■

77

▶

▶

▶

▶

78

▶

▶

▶

▶

79

■

■

■

■

80

▶

▶

▶

▶

81

■

■

■

■

82

■

■

■

■

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 83 | - | ▪ | l | - |
| 84 | ▪ | ▪ | ▪ | ▪ |
| 85 | - | ▪ | ▪ | ▪ |
| 86 | ▪ | ▪ | ▪ | ▪ |
| 87 | ▪ | ▪ | ▪ | ▪ |
| 88 | ▪ | ▪ | ▪ | ▪ |
| 89 | ▪ | ▪ | ▪ | ▪ |





















| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 90 | ' | ' | ' | ' |
| 91 | ' | - | ' | - |
| 92 | ' | ' | ' | ' |
| 93 | - | - | ' | - |
| 94 | - | ' | ' | ' |
| 95 | ' | ' | ' | ' |
| 96 | ' | ' | ' | ' |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 97 | • | • | • | • |
| 98 | • | • | • | • |
| 99 | • | • | • | • |
| 100 | • | • | • | • |
| 101 | • | • | • | • |
| 102 | • | • | • | • |
| 103 | • | • | • | • |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 104 | . | . | . | . |
| 105 | . | . | . | . |
| 106 | . | . | . | . |
| 107 | . | . | . | . |
| 108 | . | . | . | . |
| 109 | . | . | . | . |
| 110 | . | . | . | . |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 111 | . | . | . | . |
| 112 | . | . | . | . |
| 113 | - | - | . | - |

Table S2. Shape libraries to Example_2.





























| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|--|---|
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |



























































| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |



| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|--------|--------|--------|--------|
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | | | | |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|---|---|
| 20 |  |  |  |  |
| 21 |  |  |  |  |
| 22 |  |  |  |  |
| 23 |  |  |  |  |
| 24 |  |  |  |  |
| 25 |  |  |  |  |
| 26 |  |  |  |  |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|---|---|
| 27 |  |  |  |  |
| 28 |  |  |  |  |
| 29 |  |  |  |  |
| 30 |  |  |  |  |
| 31 |  |  |  |  |
| 32 |  |  |  |  |
| 33 |  |  |  |  |

| Cluster # | Target | Seed 1 | Seed 2 | Seed 3 |
|-----------|---|---|---|---|
| 34 |  |  |  |  |
| 35 |  |  |  |  |
| 36 |  |  |  |  |
| 37 |  |  |  |  |
| 38 |  |  |  |  |
| 39 |  |  |  |  |
| 40 |  |  |  |  |



Cluster #

Target

Seed 1

Seed 2

Seed 3

41

42



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