**Supplemental Table 1**

Detailed outline of the 5 scaffolding steps taken to produce final assemblies. Steps are visually shown on Figure 1 of the trio-binning workflow. After final quality control, the outputs of Step 5 were renamed as outlined in Supplemental Table 2 for release of v1.0 assemblies.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Step** | **Description** | |  |  |  | | --- | --- | --- | | **Query** | **Reference** | **Output** | |
| **Step 1** | Homology based scaffolding between Hifiasm and TrioCanu assemblies | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Hifiasm-HDA149 | + | TrioCanu-HDA149 | = | Hifiasm-HDA149.1 | | TrioCanu-HDA149 | + | Hifiasm-HDA149 | = | TrioCanu-HDA149.1 | | Hifiasm-HDA330 | + | TrioCanu-HDA330 | = | Hifiasm-HDA149.1 | | TrioCanu-HDA330 | + | Hifiasm-HDA330 | = | TrioCanu-HDA330.1 | |
| **Step 2** | Homology based gap filling between Hifiasm and TrioCanu assemblies | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Hifiasm-HDA149.1 | + | TrioCanu-HDA149.1 | = | Hifiasm-HDA149.2 | | TrioCanu-HDA149.1 | + | Hifiasm-HDA149.1 | = | TrioCanu-HDA149.2 | | Hifiasm-HDA330.1 | + | TrioCanu-HDA330.1 | = | Hifiasm-HDA149.2 | | TrioCanu-HDA330.1 | + | Hifiasm-HDA330.1 | = | TrioCanu-HDA330.2 | |
| **Step 3** | Homology based scaffolding to between HDA149 and HDA330 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Hifiasm-HDA149.2 | + | Hifiasm-HDA330.2 | = | Hifiasm-HDA149.3 | | TrioCanu-HDA149.2 | + | TrioCanu-HDA330.2 | = | TrioCanu-HDA149.3 | | Hifiasm-HDA330.2 | + | Hifiasm-HDA149.2 | = | Hifiasm-HDA149.3 | | TrioCanu-HDA330.2 | + | TrioCanu-HDA149.2 | = | TrioCanu-HDA330.3 | |
| **Step 4** | Homology based scaffolding to Bionano-contig hybrid scaffolds | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Hifiasm-HDA149.3 | + | Hifiasm-HDA330.BN | = | Hifiasm-HDA149.4 | | TrioCanu-HDA149.3 | + | TrioCanu-HDA330.BN | = | TrioCanu-HDA149.4 | | Hifiasm-HDA330.3 | + | Hifiasm-HDA149.BN | = | Hifiasm-HDA149.4 | | TrioCanu-HDA330.3 | + | TrioCanu-HDA149.BN | = | TrioCanu-HDA330.4 | |
| **Step 5** | Homology based scaffolding to Dempsey v1.0 | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Hifiasm-HDA149.4 | + | Dempsey v1.0 | = | Hifiasm-HDA149.5 | | TrioCanu-HDA149.4 | + | Dempsey v1.0 | = | TrioCanu-HDA149.5 | | Hifiasm-HDA330.4 | + | Dempsey v1.0 | = | Hifiasm-HDA149.5 | | TrioCanu-HDA330.4 | + | Dempsey v1.0 | = | TrioCanu-HDA330.5 | |