

Pham 217818





Note: Tracks are now grouped by subcluster and scaled. Switching in subcluster is indicated by changes in track color. Track scale is now set by default to display the region 30 bp upstream of start 1 to 30 bp downstream of the last possible start. If this default region is judged to be packed too tightly with annotated starts, the track will be further scaled to only show that region of the ORF with annotated starts. This action will be indicated by adding "Zoomed" to the title. For starts, yellow indicates the location of called starts comprised solely of Glimmer/GeneMark auto-annotations, green indicates the location of called starts with at least 1 manual gene annotation.

## Pham 217818 Report

This analysis was run 03/28/25 on database version 593.

Pham number 217818 has 95 members, 32 are drafts.

Phages represented in each track:

- Track 1 : Arcadia\_69, Kardesai\_69, Nason\_69, Elsa\_69, Mooshroom\_70, GoCrazy\_66, KeaneyLin\_65
- Track 2 : Cheesy\_69, Tribby\_72, Correa\_67
- Track 3 : Dynamite\_69, JEGGS\_68, NapoleonB\_70, Heisenberger\_68, Circum\_70, Benllo\_69, Mudcat\_65, BenitoAntonio\_67, Hankly\_68
- Track 4 : Xenomorph\_65
- Track 5 : Bowling\_69
- Track 6 : SilentRX\_47
- Track 7 : AWGoat\_43
- Track 8 : Salk\_65, MrAaronian\_65, BronxBay\_65, Shiba\_64, DoctorPepper\_64, Sloopyjoe\_65, Linda\_65, Michelle\_65, Djungelskog\_64, Stayer\_65, StarLord\_65
- Track 9 : Egad\_65, Raunak\_66, Boog\_65, HerbBucket\_63, ProfFrink\_65
- Track 10 : PowellDog\_68
- Track 11 : Natasha\_66
- Track 12 : Sporto\_64
- Track 13 : RustyBoy\_67
- Track 14 : AbbyDaisy\_95
- Track 15 : Sakai\_86, Auxilium\_87, Gorpy\_87
- Track 16 : Richie\_92, BenchScraper\_89
- Track 17 : YoungHarleezy\_88, Bhageatrice\_95
- Track 18 : MaterMagnus\_88
- Track 19 : Hillester\_93, RadFad\_94
- Track 20 : SpicyFrank\_91
- Track 21 : JellyBread\_85
- Track 22 : MidnightRain\_96
- Track 23 : MUWow\_90
- Track 24 : Sashimi\_92
- Track 25 : Raqqa\_93
- Track 26 : Persistence\_84
- Track 27 : Globfish\_88
- Track 28 : Anekin\_89
- Track 29 : Shukran\_86
- Track 30 : Windest\_93, Isolde\_90
- Track 31 : EvePickles\_90
- Track 32 : BillyTP\_90
- Track 33 : ThayneTheZag\_96
- Track 34 : Raphaella\_89, Vopal\_90

- Track 35 : Tiff81\_84
- Track 36 : Aikyam\_87
- Track 37 : CookieBear\_86
- Track 38 : Seahorse\_95
- Track 39 : Lawnathon\_91
- Track 40 : Faja\_90
- Track 41 : Hestia\_83
- Track 42 : MissAmericana\_13
- Track 43 : Alatato\_67
- Track 44 : Pigu\_66
- Track 45 : Sarge\_61
- Track 46 : BrayBeast\_64
- Track 47 : Shoya\_64
- Track 48 : Maruru\_67, Sonali\_66
- Track 49 : Sunshine23\_67
- Track 50 : Paella\_119, Qui\_119, Elver\_118
- Track 51 : Gandionco\_116
- Track 52 : Zucker\_89, Phrank15\_95
- Track 53 : Bauer\_86
- Track 54 : BlackSpider\_80

***Summary of Final Annotations (See graph section above for start numbers):***

The start number called the most often in the published annotations is 20, it was called in 26 of the 63 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

• AbbyDaisy\_95, Aikyam\_87, Alatato\_67, Anekin\_89, Auxilium\_87, BenchScraper\_89, Bhageatrice\_95, BillyTP\_90, BrayBeast\_64, CookieBear\_86, Elver\_118, EvePickles\_90, Faja\_90, Gandionco\_116, Globfish\_88, Gorpy\_87, Hestia\_83, Hillester\_93, Isolde\_90, Lawnathon\_91, MUWow\_90, MaterMagnus\_88, MidnightRain\_96, MissAmericana\_13, Paella\_119, Persistence\_84, Phrank15\_95, Qui\_119, RadFad\_94, Raphaella\_89, Raqqa\_93, Richie\_92, Sakai\_86, Sarge\_61, Sashimi\_92, Seahorse\_95, Shoya\_64, Shukran\_86, SpicyFrank\_91, ThayneTheZag\_96, Tiff81\_84, Vopal\_90, Windest\_93, YoungHarleezy\_88, Zucker\_89,

Genes that have the "Most Annotated" start but do not call it:

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Genes that do not have the "Most Annotated" start:

• AWGoat\_43, Arcadia\_69, Bauer\_86, BenitoAntonio\_67, Benllo\_69, BlackSpider\_80, Boog\_65, Bowling\_69, BronxBay\_65, Cheesy\_69, Circum\_70, Correa\_67, Djungelskog\_64, DoctorPepper\_64, Dynamite\_69, Egad\_65, Elsa\_69, GoCrazy\_66, Hankly\_68, Heisenberger\_68, HerbBucket\_63, JEGGS\_68, JellyBread\_85, Kardesai\_69, KeaneyLin\_65, Linda\_65, Maruru\_67, Michelle\_65, Mooshroom\_70, MrAaronian\_65, Mudcat\_65, NapoleonB\_70, Nason\_69, Natasha\_66, Pigu\_66, PowellDog\_68, ProfFrink\_65, Raunak\_66, RustyBoy\_67, Salk\_65, Shiba\_64, SilentRX\_47, Sloopyjoe\_65, Sonali\_66, Sporto\_64, StarLord\_65, Stayer\_65, Sunshine23\_67, Tribby\_72, Xenomorph\_65,

## Summary by start number:

### Start 6:

- Found in 2 of 95 ( 2.1% ) of genes in pham
- No Manual Annotations of this start.
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BlackSpider\_80 (FN), JellyBread\_85 (AY),

### Start 15:

- Found in 3 of 95 ( 3.2% ) of genes in pham
- Manual Annotations of this start: 1 of 63
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Maruru\_67 (FG), Sonali\_66 (FG), Sunshine23\_67 (FG),

### Start 17:

- Found in 21 of 95 ( 22.1% ) of genes in pham
- Manual Annotations of this start: 19 of 63
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Arcadia\_69 (AM), BenitoAntonio\_67 (AM), Benllo\_69 (AM), Bowling\_69 (AM), Cheesy\_69 (AM), Circum\_70 (AM), Correa\_67 (AM), Dynamite\_69 (AM), Elsa\_69 (AM), GoCrazy\_66 (AM), Hankly\_68 (AM), Heisenberger\_68 (AM), JEGGS\_68 (AM), Kardesai\_69 (AM), KeaneyLin\_65 (AM), Mooshroom\_70 (AM), Mudcat\_65 (AM), NapoleonB\_70 (AM), Nason\_69 (AM), Tribby\_72 (AM), Xenomorph\_65 (AM),

### Start 18:

- Found in 1 of 95 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 63
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AWGoat\_43 (AP4),

### Start 20:

- Found in 45 of 95 ( 47.4% ) of genes in pham
- Manual Annotations of this start: 26 of 63
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AbbyDaisy\_95 (AY), Aikyam\_87 (AY), Alatato\_67 (FB), Anekin\_89 (AY), Auxilium\_87 (AY), BenchScraper\_89 (AY), Bhageatrice\_95 (AY), BillyTP\_90 (AY), BrayBeast\_64 (FB), CookieBear\_86 (AY), Elver\_118 (FK), EvePickles\_90 (AY), Faja\_90 (AY), Gandionco\_116 (FK), Globfish\_88 (AY), Gorpy\_87 (AY), Hestia\_83 (AY), Hillester\_93 (AY), Isolde\_90 (AY), Lawnathon\_91 (AY), MUWow\_90 (AY), MaterMagnus\_88 (AY), MidnightRain\_96 (AY), MissAmericana\_13 (EM2), Paella\_119 (FK), Persistence\_84 (AY), Phrank15\_95 (AY), Qui\_119 (FK), RadFad\_94 (AY), Raphaella\_89 (AY), Raqqa\_93 (AY), Richie\_92 (AY), Sakai\_86 (AY), Sarge\_61 (FB), Sashimi\_92 (AY), Seahorse\_95 (AY), Shoya\_64 (FB), Shukran\_86 (AY), SpicyFrank\_91 (AY), ThayneTheZag\_96 (AY), Tiff81\_84 (AY), Vopal\_90 (AY), Windest\_93 (AY), YoungHarleezy\_88 (AY), Zucker\_89 (FN),

### Start 21:

- Found in 1 of 95 ( 1.1% ) of genes in pham
- Manual Annotations of this start: 1 of 63

- Called 100.0% of time when present
- Phage (with cluster) where this start called: SilentRX\_47 (AP4),

Start 22:

- Found in 7 of 95 ( 7.4% ) of genes in pham
- Manual Annotations of this start: 1 of 63
- Called 28.6% of time when present
- Phage (with cluster) where this start called: Bauer\_86 (FN), Pigu\_66 (FB),

Start 23:

- Found in 20 of 95 ( 21.1% ) of genes in pham
- Manual Annotations of this start: 14 of 63
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Boog\_65 (AW), BronxBay\_65 (AW), Djungelskog\_64 (AW), DoctorPepper\_64 (AW), Egad\_65 (AW), HerbBucket\_63 (AW), Linda\_65 (AW), Michelle\_65 (AW), MrAaronian\_65 (AW), Natasha\_66 (AW), Powelldog\_68 (AW), ProfFrink\_65 (AW), Raunak\_66 (AW), RustyBoy\_67 (AW), Salk\_65 (AW), Shiba\_64 (AW), Sloopyjoe\_65 (AW), Sporto\_64 (AW), StarLord\_65 (AW), Stayer\_65 (AW),

### **Summary by clusters:**

There are 9 clusters represented in this pham: EM2, AM, AP4, FB, AW, FG, AY, FK, FN,

Info for manual annotations of cluster AM:

- Start number 17 was manually annotated 19 times for cluster AM.

Info for manual annotations of cluster AP4:

- Start number 18 was manually annotated 1 time for cluster AP4.
- Start number 21 was manually annotated 1 time for cluster AP4.

Info for manual annotations of cluster AW:

- Start number 23 was manually annotated 14 times for cluster AW.

Info for manual annotations of cluster AY:

- Start number 20 was manually annotated 19 times for cluster AY.

Info for manual annotations of cluster EM2:

- Start number 20 was manually annotated 1 time for cluster EM2.

Info for manual annotations of cluster FB:

- Start number 20 was manually annotated 3 times for cluster FB.

Info for manual annotations of cluster FG:

- Start number 15 was manually annotated 1 time for cluster FG.

Info for manual annotations of cluster FK:

- Start number 20 was manually annotated 2 times for cluster FK.

Info for manual annotations of cluster FN:

- Start number 20 was manually annotated 1 time for cluster FN.
- Start number 22 was manually annotated 1 time for cluster FN.

**Gene Information:**

Gene: AWGoat\_43 Start: 36435, Stop: 36184, Start Num: 18

Candidate Starts for AWGoat\_43:

(Start: 18 @36435 has 1 MA's), (26, 36378), (33, 36336), (41, 36270),

Gene: AbbyDaisy\_95 Start: 52716, Stop: 52943, Start Num: 20

Candidate Starts for AbbyDaisy\_95:

(Start: 20 @52716 has 26 MA's), (29, 52788), (33, 52809), (41, 52875), (42, 52878), (44, 52896),

Gene: Aikyam\_87 Start: 47697, Stop: 47942, Start Num: 20

Candidate Starts for Aikyam\_87:

(Start: 20 @47697 has 26 MA's), (26, 47739), (35, 47802), (39, 47826), (45, 47877),

Gene: Alatato\_67 Start: 36428, Stop: 36655, Start Num: 20

Candidate Starts for Alatato\_67:

(1, 36107), (Start: 20 @36428 has 26 MA's), (29, 36500), (33, 36521), (41, 36587), (42, 36590), (44, 36608),

Gene: Anekin\_89 Start: 49928, Stop: 50155, Start Num: 20

Candidate Starts for Anekin\_89:

(Start: 20 @49928 has 26 MA's), (Start: 22 @49934 has 1 MA's), (29, 50000), (33, 50021), (41, 50087), (42, 50090),

Gene: Arcadia\_69 Start: 43472, Stop: 43750, Start Num: 17

Candidate Starts for Arcadia\_69:

(Start: 17 @43472 has 19 MA's), (25, 43517), (27, 43532), (29, 43550), (36, 43601), (42, 43649), (44, 43667),

Gene: Auxilium\_87 Start: 46996, Stop: 47223, Start Num: 20

Candidate Starts for Auxilium\_87:

(Start: 20 @46996 has 26 MA's), (29, 47068), (33, 47089), (41, 47155), (42, 47158),

Gene: Bauer\_86 Start: 46271, Stop: 46492, Start Num: 22

Candidate Starts for Bauer\_86:

(2, 45926), (9, 46157), (12, 46205), (Start: 22 @46271 has 1 MA's), (29, 46337), (33, 46358), (41, 46424), (42, 46427), (44, 46445), (47, 46475),

Gene: BenchScraper\_89 Start: 47947, Stop: 48174, Start Num: 20

Candidate Starts for BenchScraper\_89:

(Start: 20 @47947 has 26 MA's), (29, 48019), (33, 48040), (41, 48106), (42, 48109), (47, 48157),

Gene: BenitoAntonio\_67 Start: 42507, Stop: 42785, Start Num: 17

Candidate Starts for BenitoAntonio\_67:

(Start: 17 @42507 has 19 MA's), (25, 42552), (27, 42567), (29, 42585), (36, 42636), (42, 42684), (44, 42702), (49, 42750),

Gene: Benllo\_69 Start: 43185, Stop: 43463, Start Num: 17

Candidate Starts for Benllo\_69:

(Start: 17 @43185 has 19 MA's), (25, 43230), (27, 43245), (29, 43263), (36, 43314), (42, 43362), (44, 43380), (49, 43428),

Gene: Bhageatrice\_95 Start: 52222, Stop: 52449, Start Num: 20

Candidate Starts for Bhageatrice\_95:

(Start: 20 @52222 has 26 MA's), (Start: 22 @52228 has 1 MA's), (26, 52273), (29, 52294), (33, 52315), (41, 52381), (42, 52384),

Gene: BillyTP\_90 Start: 50050, Stop: 50289, Start Num: 20

Candidate Starts for BillyTP\_90:

(Start: 20 @50050 has 26 MA's), (26, 50092), (35, 50155), (45, 50230),

Gene: BlackSpider\_80 Start: 47304, Stop: 47531, Start Num: 6

Candidate Starts for BlackSpider\_80:

(6, 47304), (29, 47376), (33, 47397), (41, 47463), (42, 47466), (47, 47514),

Gene: Boog\_65 Start: 42243, Stop: 42494, Start Num: 23

Candidate Starts for Boog\_65:

(Start: 23 @42243 has 14 MA's), (34, 42330), (38, 42363), (41, 42387), (42, 42390),

Gene: Bowling\_69 Start: 43461, Stop: 43739, Start Num: 17

Candidate Starts for Bowling\_69:

(Start: 17 @43461 has 19 MA's), (25, 43506), (29, 43539), (36, 43590), (42, 43638), (44, 43656), (49, 43704),

Gene: BrayBeast\_64 Start: 36058, Stop: 36285, Start Num: 20

Candidate Starts for BrayBeast\_64:

(5, 35845), (Start: 20 @36058 has 26 MA's), (29, 36130), (37, 36187), (42, 36220),

Gene: BronxBay\_65 Start: 42499, Stop: 42750, Start Num: 23

Candidate Starts for BronxBay\_65:

(Start: 23 @42499 has 14 MA's), (34, 42586), (38, 42619), (41, 42643), (42, 42646), (51, 42727),

Gene: Cheesy\_69 Start: 42699, Stop: 42977, Start Num: 17

Candidate Starts for Cheesy\_69:

(Start: 17 @42699 has 19 MA's), (25, 42744), (29, 42777), (36, 42828), (42, 42876), (44, 42894), (46, 42921), (49, 42942),

Gene: Circum\_70 Start: 43275, Stop: 43553, Start Num: 17

Candidate Starts for Circum\_70:

(Start: 17 @43275 has 19 MA's), (25, 43320), (27, 43335), (29, 43353), (36, 43404), (42, 43452), (44, 43470), (49, 43518),

Gene: CookieBear\_86 Start: 49258, Stop: 49497, Start Num: 20

Candidate Starts for CookieBear\_86:

(Start: 20 @49258 has 26 MA's), (26, 49300), (35, 49363), (45, 49438),

Gene: Correa\_67 Start: 42273, Stop: 42551, Start Num: 17

Candidate Starts for Correa\_67:

(Start: 17 @42273 has 19 MA's), (25, 42318), (29, 42351), (36, 42402), (42, 42450), (44, 42468), (46, 42495), (49, 42516),

Gene: Djungelskog\_64 Start: 42498, Stop: 42749, Start Num: 23



Candidate Starts for Djungelskog\_64:

(Start: 23 @42498 has 14 MA's), (34, 42585), (38, 42618), (41, 42642), (42, 42645), (51, 42726),

Gene: DoctorPepper\_64 Start: 42203, Stop: 42454, Start Num: 23

Candidate Starts for DoctorPepper\_64:

(Start: 23 @42203 has 14 MA's), (34, 42290), (38, 42323), (41, 42347), (42, 42350), (51, 42431),

Gene: Dynamite\_69 Start: 43288, Stop: 43566, Start Num: 17

Candidate Starts for Dynamite\_69:

(Start: 17 @43288 has 19 MA's), (25, 43333), (27, 43348), (29, 43366), (36, 43417), (42, 43465), (44, 43483), (49, 43531),

Gene: Egad\_65 Start: 42494, Stop: 42745, Start Num: 23

Candidate Starts for Egad\_65:

(Start: 23 @42494 has 14 MA's), (34, 42581), (38, 42614), (41, 42638), (42, 42641),

Gene: Elsa\_69 Start: 43472, Stop: 43750, Start Num: 17

Candidate Starts for Elsa\_69:

(Start: 17 @43472 has 19 MA's), (25, 43517), (27, 43532), (29, 43550), (36, 43601), (42, 43649), (44, 43667),

Gene: Elver\_118 Start: 65771, Stop: 66007, Start Num: 20

Candidate Starts for Elver\_118:

(19, 65768), (Start: 20 @65771 has 26 MA's), (28, 65837), (40, 65921), (42, 65930), (43, 65933), (44, 65948),

Gene: EvePickles\_90 Start: 50663, Stop: 50890, Start Num: 20

Candidate Starts for EvePickles\_90:

(Start: 20 @50663 has 26 MA's), (26, 50714), (29, 50735), (33, 50756), (41, 50822), (42, 50825), (44, 50843),

Gene: Faja\_90 Start: 49924, Stop: 50151, Start Num: 20

Candidate Starts for Faja\_90:

(3, 49681), (Start: 20 @49924 has 26 MA's), (26, 49975), (29, 49996), (41, 50083), (42, 50086), (44, 50104),

Gene: Gandionco\_116 Start: 64583, Stop: 64819, Start Num: 20

Candidate Starts for Gandionco\_116:

(13, 64550), (19, 64580), (Start: 20 @64583 has 26 MA's), (28, 64649), (40, 64733), (42, 64742), (43, 64745), (44, 64760),

Gene: Globfish\_88 Start: 48667, Stop: 48894, Start Num: 20

Candidate Starts for Globfish\_88:

(Start: 20 @48667 has 26 MA's), (29, 48739), (41, 48826), (42, 48829), (44, 48847),

Gene: GoCrazy\_66 Start: 42732, Stop: 43010, Start Num: 17

Candidate Starts for GoCrazy\_66:

(Start: 17 @42732 has 19 MA's), (25, 42777), (27, 42792), (29, 42810), (36, 42861), (42, 42909), (44, 42927),

Gene: Gorpy\_87 Start: 50675, Stop: 50902, Start Num: 20

Candidate Starts for Gorpy\_87:

(Start: 20 @50675 has 26 MA's), (29, 50747), (33, 50768), (41, 50834), (42, 50837),

Gene: Hankly\_68 Start: 42356, Stop: 42634, Start Num: 17

Candidate Starts for Hankly\_68:

(Start: 17 @42356 has 19 MA's), (25, 42401), (27, 42416), (29, 42434), (36, 42485), (42, 42533), (44, 42551), (49, 42599),

Gene: Heisenberger\_68 Start: 42694, Stop: 42972, Start Num: 17

Candidate Starts for Heisenberger\_68:

(Start: 17 @42694 has 19 MA's), (25, 42739), (27, 42754), (29, 42772), (36, 42823), (42, 42871), (44, 42889), (49, 42937),

Gene: HerbBucket\_63 Start: 42225, Stop: 42476, Start Num: 23

Candidate Starts for HerbBucket\_63:

(Start: 23 @42225 has 14 MA's), (34, 42312), (38, 42345), (41, 42369), (42, 42372),

Gene: Hestia\_83 Start: 47282, Stop: 47509, Start Num: 20

Candidate Starts for Hestia\_83:

(Start: 20 @47282 has 26 MA's), (29, 47354), (33, 47375), (41, 47441), (42, 47444),

Gene: Hillester\_93 Start: 49669, Stop: 49896, Start Num: 20

Candidate Starts for Hillester\_93:

(Start: 20 @49669 has 26 MA's), (29, 49741), (33, 49762), (41, 49828), (42, 49831), (44, 49849), (47, 49879),

Gene: Isolde\_90 Start: 50517, Stop: 50744, Start Num: 20

Candidate Starts for Isolde\_90:

(Start: 20 @50517 has 26 MA's), (Start: 22 @50523 has 1 MA's), (26, 50568), (29, 50589), (33, 50610), (41, 50676), (42, 50679), (44, 50697),

Gene: JEGGS\_68 Start: 42773, Stop: 43051, Start Num: 17

Candidate Starts for JEGGS\_68:

(Start: 17 @42773 has 19 MA's), (25, 42818), (27, 42833), (29, 42851), (36, 42902), (42, 42950), (44, 42968), (49, 43016),

Gene: JellyBread\_85 Start: 49663, Stop: 49890, Start Num: 6

Candidate Starts for JellyBread\_85:

(6, 49663), (29, 49735), (33, 49756), (41, 49822), (42, 49825), (44, 49843), (47, 49873),

Gene: Kardesai\_69 Start: 43082, Stop: 43360, Start Num: 17

Candidate Starts for Kardesai\_69:

(Start: 17 @43082 has 19 MA's), (25, 43127), (27, 43142), (29, 43160), (36, 43211), (42, 43259), (44, 43277),

Gene: KeaneyLin\_65 Start: 42732, Stop: 43010, Start Num: 17

Candidate Starts for KeaneyLin\_65:

(Start: 17 @42732 has 19 MA's), (25, 42777), (27, 42792), (29, 42810), (36, 42861), (42, 42909), (44, 42927),

Gene: Lawnathon\_91 Start: 50019, Stop: 50246, Start Num: 20

Candidate Starts for Lawnathon\_91:

(Start: 20 @50019 has 26 MA's), (29, 50091), (33, 50112), (41, 50178), (42, 50181), (44, 50199), (47, 50229), (48, 50238),

Gene: Linda\_65 Start: 42496, Stop: 42747, Start Num: 23  
Candidate Starts for Linda\_65:  
(Start: 23 @42496 has 14 MA's), (34, 42583), (38, 42616), (41, 42640), (42, 42643), (51, 42724),

Gene: MUWow\_90 Start: 50713, Stop: 50940, Start Num: 20  
Candidate Starts for MUWow\_90:  
(Start: 20 @50713 has 26 MA's), (29, 50785), (32, 50803), (34, 50815), (42, 50875), (45, 50902),

Gene: Maruru\_67 Start: 45050, Stop: 45310, Start Num: 15  
Candidate Starts for Maruru\_67:  
(4, 44834), (Start: 15 @45050 has 1 MA's), (29, 45140), (31, 45152), (42, 45230), (44, 45248),

Gene: MaterMagnus\_88 Start: 49961, Stop: 50188, Start Num: 20  
Candidate Starts for MaterMagnus\_88:  
(Start: 20 @49961 has 26 MA's), (29, 50033), (33, 50054), (41, 50120), (42, 50123),

Gene: Michelle\_65 Start: 42498, Stop: 42749, Start Num: 23  
Candidate Starts for Michelle\_65:  
(Start: 23 @42498 has 14 MA's), (34, 42585), (38, 42618), (41, 42642), (42, 42645), (51, 42726),

Gene: MidnightRain\_96 Start: 51168, Stop: 51395, Start Num: 20  
Candidate Starts for MidnightRain\_96:  
(Start: 20 @51168 has 26 MA's), (26, 51219), (29, 51240), (33, 51261), (41, 51327), (42, 51330), (44, 51348),

Gene: MissAmericana\_13 Start: 9042, Stop: 8782, Start Num: 20  
Candidate Starts for MissAmericana\_13:  
(14, 9063), (Start: 20 @9042 has 26 MA's), (35, 8925), (45, 8850),

Gene: Mooshroom\_70 Start: 43082, Stop: 43360, Start Num: 17  
Candidate Starts for Mooshroom\_70:  
(Start: 17 @43082 has 19 MA's), (25, 43127), (27, 43142), (29, 43160), (36, 43211), (42, 43259), (44, 43277),

Gene: MrAaronian\_65 Start: 42498, Stop: 42749, Start Num: 23  
Candidate Starts for MrAaronian\_65:  
(Start: 23 @42498 has 14 MA's), (34, 42585), (38, 42618), (41, 42642), (42, 42645), (51, 42726),

Gene: Mudcat\_65 Start: 44131, Stop: 44409, Start Num: 17  
Candidate Starts for Mudcat\_65:  
(Start: 17 @44131 has 19 MA's), (25, 44176), (27, 44191), (29, 44209), (36, 44260), (42, 44308), (44, 44326), (49, 44374),

Gene: NapoleonB\_70 Start: 43288, Stop: 43566, Start Num: 17  
Candidate Starts for NapoleonB\_70:  
(Start: 17 @43288 has 19 MA's), (25, 43333), (27, 43348), (29, 43366), (36, 43417), (42, 43465), (44, 43483), (49, 43531),

Gene: Nason\_69 Start: 43472, Stop: 43750, Start Num: 17  
Candidate Starts for Nason\_69:  
(Start: 17 @43472 has 19 MA's), (25, 43517), (27, 43532), (29, 43550), (36, 43601), (42, 43649), (44, 43667),

Gene: Natasha\_66 Start: 42448, Stop: 42690, Start Num: 23  
Candidate Starts for Natasha\_66:  
(Start: 23 @42448 has 14 MA's), (40, 42586), (41, 42592), (42, 42595), (50, 42667),

Gene: Paella\_119 Start: 66359, Stop: 66595, Start Num: 20  
Candidate Starts for Paella\_119:  
(19, 66356), (Start: 20 @66359 has 26 MA's), (28, 66425), (40, 66509), (42, 66518), (43, 66521), (44, 66536),

Gene: Persistence\_84 Start: 47327, Stop: 47554, Start Num: 20  
Candidate Starts for Persistence\_84:  
(Start: 20 @47327 has 26 MA's), (26, 47378), (29, 47399), (33, 47420), (41, 47486), (42, 47489),

Gene: Phrank15\_95 Start: 50347, Stop: 50574, Start Num: 20  
Candidate Starts for Phrank15\_95:  
(Start: 20 @50347 has 26 MA's), (29, 50419), (33, 50440), (41, 50506), (42, 50509),

Gene: Pigu\_66 Start: 34831, Stop: 35052, Start Num: 22  
Candidate Starts for Pigu\_66:  
(Start: 22 @34831 has 1 MA's), (29, 34897), (37, 34954), (42, 34987),

Gene: Powelldog\_68 Start: 42912, Stop: 43187, Start Num: 23  
Candidate Starts for Powelldog\_68:  
(7, 42711), (Start: 23 @42912 has 14 MA's), (24, 42924), (34, 42999), (42, 43059), (52, 43161),

Gene: ProfFrink\_65 Start: 42493, Stop: 42744, Start Num: 23  
Candidate Starts for ProfFrink\_65:  
(Start: 23 @42493 has 14 MA's), (34, 42580), (38, 42613), (41, 42637), (42, 42640),

Gene: Qui\_119 Start: 66359, Stop: 66595, Start Num: 20  
Candidate Starts for Qui\_119:  
(19, 66356), (Start: 20 @66359 has 26 MA's), (28, 66425), (40, 66509), (42, 66518), (43, 66521), (44, 66536),

Gene: RadFad\_94 Start: 49669, Stop: 49896, Start Num: 20  
Candidate Starts for RadFad\_94:  
(Start: 20 @49669 has 26 MA's), (29, 49741), (33, 49762), (41, 49828), (42, 49831), (44, 49849), (47, 49879),

Gene: Raphaella\_89 Start: 48624, Stop: 48887, Start Num: 20  
Candidate Starts for Raphaella\_89:  
(Start: 20 @48624 has 26 MA's), (30, 48705), (31, 48711),

Gene: Raqqa\_93 Start: 50720, Stop: 50947, Start Num: 20  
Candidate Starts for Raqqa\_93:  
(10, 50645), (11, 50678), (Start: 20 @50720 has 26 MA's), (29, 50792), (41, 50879), (42, 50882), (44, 50900),

Gene: Raunak\_66 Start: 42154, Stop: 42405, Start Num: 23  
Candidate Starts for Raunak\_66:  
(Start: 23 @42154 has 14 MA's), (34, 42241), (38, 42274), (41, 42298), (42, 42301),

Gene: Richie\_92 Start: 50519, Stop: 50746, Start Num: 20

Candidate Starts for Richie\_92:

(Start: 20 @50519 has 26 MA's), (29, 50591), (33, 50612), (41, 50678), (42, 50681), (47, 50729),

Gene: RustyBoy\_67 Start: 42647, Stop: 42889, Start Num: 23

Candidate Starts for RustyBoy\_67:

(7, 42443), (8, 42479), (Start: 23 @42647 has 14 MA's), (40, 42785), (41, 42791), (42, 42794), (50, 42866),

Gene: Sakai\_86 Start: 49386, Stop: 49613, Start Num: 20

Candidate Starts for Sakai\_86:

(Start: 20 @49386 has 26 MA's), (29, 49458), (33, 49479), (41, 49545), (42, 49548),

Gene: Salk\_65 Start: 42496, Stop: 42747, Start Num: 23

Candidate Starts for Salk\_65:

(Start: 23 @42496 has 14 MA's), (34, 42583), (38, 42616), (41, 42640), (42, 42643), (51, 42724),

Gene: Sarge\_61 Start: 33816, Stop: 34043, Start Num: 20

Candidate Starts for Sarge\_61:

(Start: 20 @33816 has 26 MA's), (26, 33867), (29, 33888), (37, 33945), (42, 33978),

Gene: Sashimi\_92 Start: 49657, Stop: 49884, Start Num: 20

Candidate Starts for Sashimi\_92:

(16, 49651), (Start: 20 @49657 has 26 MA's), (26, 49708), (29, 49729), (33, 49750), (41, 49816), (42, 49819),

Gene: Seahorse\_95 Start: 54032, Stop: 54259, Start Num: 20

Candidate Starts for Seahorse\_95:

(Start: 20 @54032 has 26 MA's), (29, 54104), (33, 54125), (41, 54191), (42, 54194), (47, 54242),

Gene: Shiba\_64 Start: 42154, Stop: 42405, Start Num: 23

Candidate Starts for Shiba\_64:

(Start: 23 @42154 has 14 MA's), (34, 42241), (38, 42274), (41, 42298), (42, 42301), (51, 42382),

Gene: Shoya\_64 Start: 35887, Stop: 36126, Start Num: 20

Candidate Starts for Shoya\_64:

(Start: 20 @35887 has 26 MA's), (35, 35992), (40, 36031), (45, 36067),

Gene: Shukran\_86 Start: 47862, Stop: 48089, Start Num: 20

Candidate Starts for Shukran\_86:

(Start: 20 @47862 has 26 MA's), (29, 47934), (31, 47946), (41, 48021), (42, 48024),

Gene: SilentRX\_47 Start: 38442, Stop: 38200, Start Num: 21

Candidate Starts for SilentRX\_47:

(Start: 21 @38442 has 1 MA's), (26, 38391), (31, 38358), (41, 38283),

Gene: Sloopyjoe\_65 Start: 42500, Stop: 42751, Start Num: 23

Candidate Starts for Sloopyjoe\_65:

(Start: 23 @42500 has 14 MA's), (34, 42587), (38, 42620), (41, 42644), (42, 42647), (51, 42728),

Gene: Sonali\_66 Start: 45518, Stop: 45778, Start Num: 15

Candidate Starts for Sonali\_66:

(4, 45302), (Start: 15 @45518 has 1 MA's), (29, 45608), (31, 45620), (42, 45698), (44, 45716),

Gene: SpicyFrank\_91 Start: 49438, Stop: 49665, Start Num: 20  
Candidate Starts for SpicyFrank\_91:  
(Start: 20 @49438 has 26 MA's), (29, 49510), (41, 49597), (42, 49600),

Gene: Sporto\_64 Start: 43615, Stop: 43866, Start Num: 23  
Candidate Starts for Sporto\_64:  
(Start: 23 @43615 has 14 MA's), (41, 43759), (42, 43762), (51, 43843),

Gene: StarLord\_65 Start: 42493, Stop: 42744, Start Num: 23  
Candidate Starts for StarLord\_65:  
(Start: 23 @42493 has 14 MA's), (34, 42580), (38, 42613), (41, 42637), (42, 42640), (51, 42721),

Gene: Stayer\_65 Start: 42496, Stop: 42747, Start Num: 23  
Candidate Starts for Stayer\_65:  
(Start: 23 @42496 has 14 MA's), (34, 42583), (38, 42616), (41, 42640), (42, 42643), (51, 42724),

Gene: Sunshine23\_67 Start: 45169, Stop: 45429, Start Num: 15  
Candidate Starts for Sunshine23\_67:  
(Start: 15 @45169 has 1 MA's), (29, 45259), (31, 45271), (42, 45349), (44, 45367),

Gene: ThayneTheZag\_96 Start: 51075, Stop: 51302, Start Num: 20  
Candidate Starts for ThayneTheZag\_96:  
(Start: 20 @51075 has 26 MA's), (26, 51126), (29, 51147), (41, 51234), (42, 51237), (44, 51255), (47, 51285),

Gene: Tiff81\_84 Start: 47744, Stop: 48007, Start Num: 20  
Candidate Starts for Tiff81\_84:  
(Start: 20 @47744 has 26 MA's), (30, 47825), (31, 47831),

Gene: Tribby\_72 Start: 43659, Stop: 43937, Start Num: 17  
Candidate Starts for Tribby\_72:  
(Start: 17 @43659 has 19 MA's), (25, 43704), (29, 43737), (36, 43788), (42, 43836), (44, 43854), (46, 43881), (49, 43902),

Gene: Vopal\_90 Start: 50690, Stop: 50953, Start Num: 20  
Candidate Starts for Vopal\_90:  
(Start: 20 @50690 has 26 MA's), (30, 50771), (31, 50777),

Gene: Windest\_93 Start: 48912, Stop: 49139, Start Num: 20  
Candidate Starts for Windest\_93:  
(Start: 20 @48912 has 26 MA's), (Start: 22 @48918 has 1 MA's), (26, 48963), (29, 48984), (33, 49005), (41, 49071), (42, 49074), (44, 49092),

Gene: Xenomorph\_65 Start: 43143, Stop: 43421, Start Num: 17  
Candidate Starts for Xenomorph\_65:  
(Start: 17 @43143 has 19 MA's), (25, 43188), (27, 43203), (29, 43221), (36, 43272), (42, 43320), (44, 43338), (46, 43365), (49, 43386),

Gene: YoungHarleezy\_88 Start: 50145, Stop: 50372, Start Num: 20  
Candidate Starts for YoungHarleezy\_88:  
(Start: 20 @50145 has 26 MA's), (Start: 22 @50151 has 1 MA's), (26, 50196), (29, 50217), (33, 50238), (41, 50304), (42, 50307),

Gene: Zucker\_89 Start: 50629, Stop: 50856, Start Num: 20

Candidate Starts for Zucker\_89:

(Start: 20 @50629 has 26 MA's), (29, 50701), (33, 50722), (41, 50788), (42, 50791),