Pensieve header: Planet Earth pulled back to the Hopf fibration - one country per continent.

```
SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\PlanetHopf"];
<< PlanetHopf-Programs.m
```

```
ghosts = {"Canada", "China", "Italy", "SouthAfrica", "Colombia"};
solids = Union[ghosts, {"Mexico", "Japan", "Ghana", "India"}; {}];
```

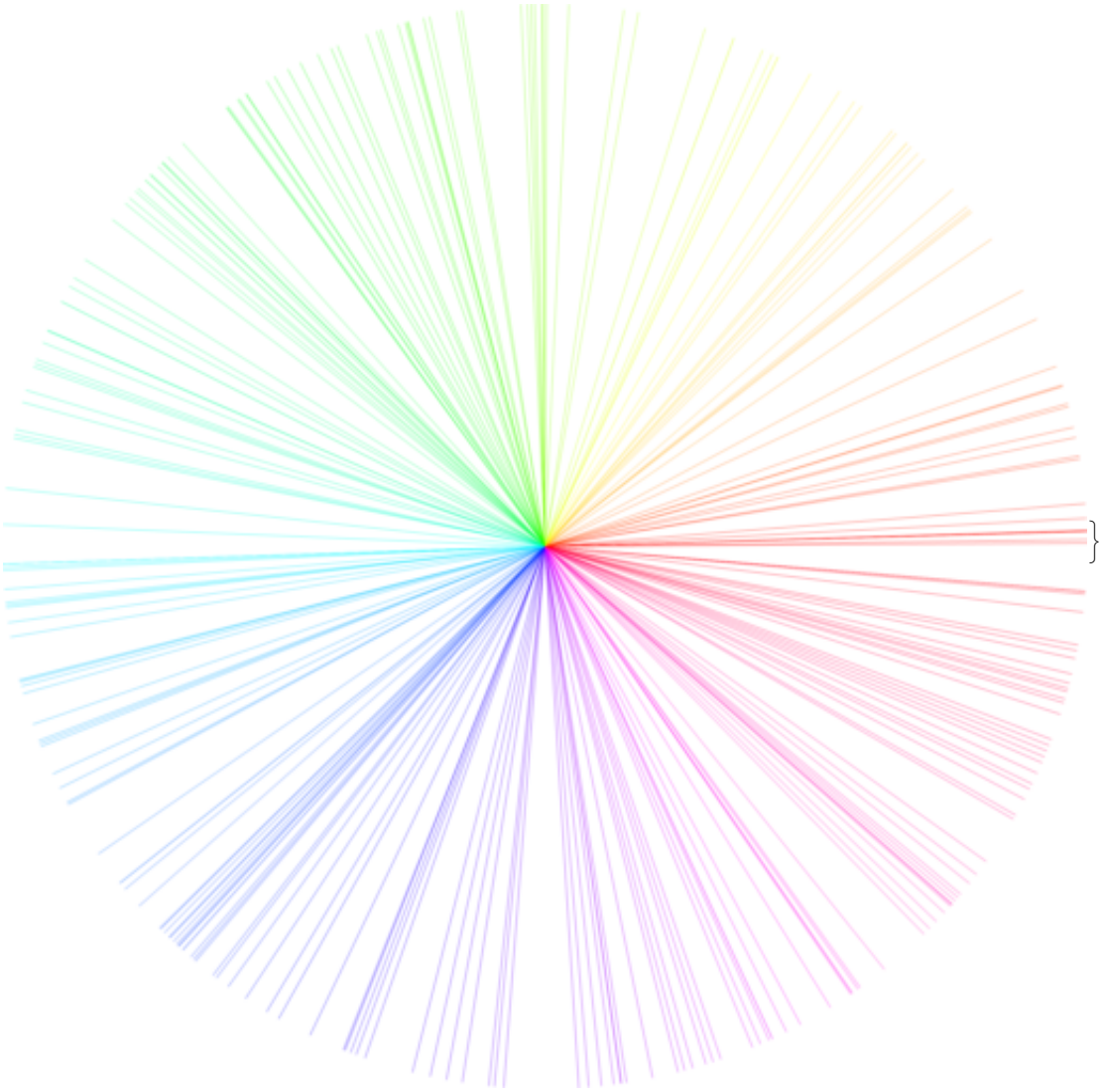
```
MakeColourScheme[AllCountries, {
   {"Canada", "Greenland"}, {"Canada", "Russia"}, {"UnitedStates", "Russia"},
   {"Canada", "Mexico"}, {"Malaysia", "PapuaNewGuinea"},
   {"Japan", "Russia"}, {"Japan", "SouthKorea"},
   {"Kazakhstan", "Mongolia"}, {"Australia", "NewZealand"},
   {"Australia", "Indonesia"}, {"Australia", "PapuaNewGuinea"},
   {"China", "Japan"}, {"China", "SouthKorea"},
   {"NorthKorea", "Japan"}, {"UnitedStates", "Greenland"},
   {"Greenland", "Russia"}, {"Pakistan", "Tajikistan"}, ghosts
  }];
LoadColourScheme["101204-183102"]
```

```
Country colouring process changes:
 {30.4124, 10.1367, 6.5867, 5.837, 4.76326, 4.24054, 5.22897, 5.67488,
  4.03191, 4.31965, 6.37193, 5.83356, 5.01844, 3.47666, 5.4475, 4.68822,
  5.02793, 4.30051, 3.9045, 3.70818, 3.44941, 4.2122, 3.53141, 3.27838,
  4.32697, 5.37841, 3.48808, 5.33819, 4.49702, 4.51802, 4.44435, 5.17014}
```

```
CountryColour /@ ghosts
```

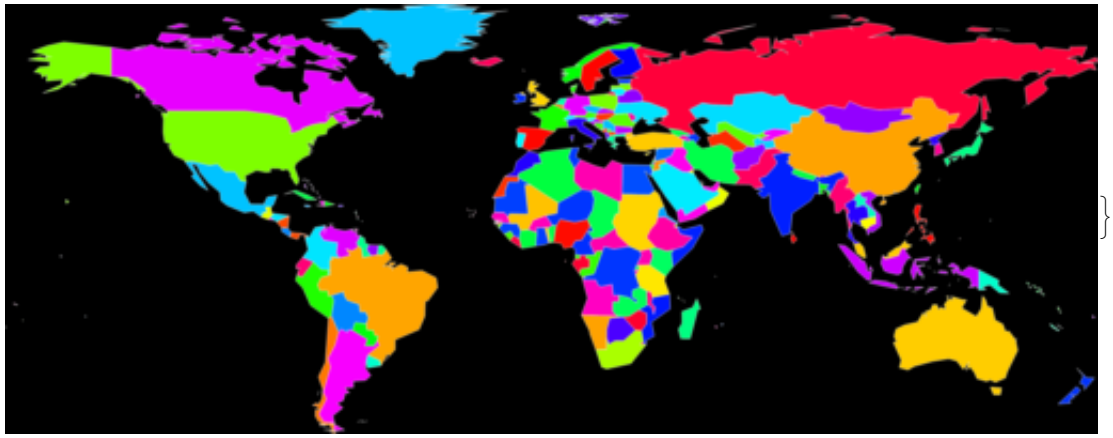
```
{0.817808, 0.106567, 0.693354, 0.222428, 0.517276}
```

```
MakeImage["ColourWheel", Graphics[
  {
     Hue[c = CountryColour[#]],
     Line[{{0, 0}, {Cos[2 Pi c], Sin[2 Pi c]}}]
    } & /@ AllCountries
 ]]
```



{3.265,

```
MakeImage["BaseMap", Graphics[{
   EdgeForm[White],
   {
      Hue[CountryColour[#]],
      CountryShape[#] /.
       {CountryShape → List, Region[pts___] :↦ Polygon[{pts} /. LonLat → List]}
     } & /@
    (AllCountries)
  }, Background → Black]]
```

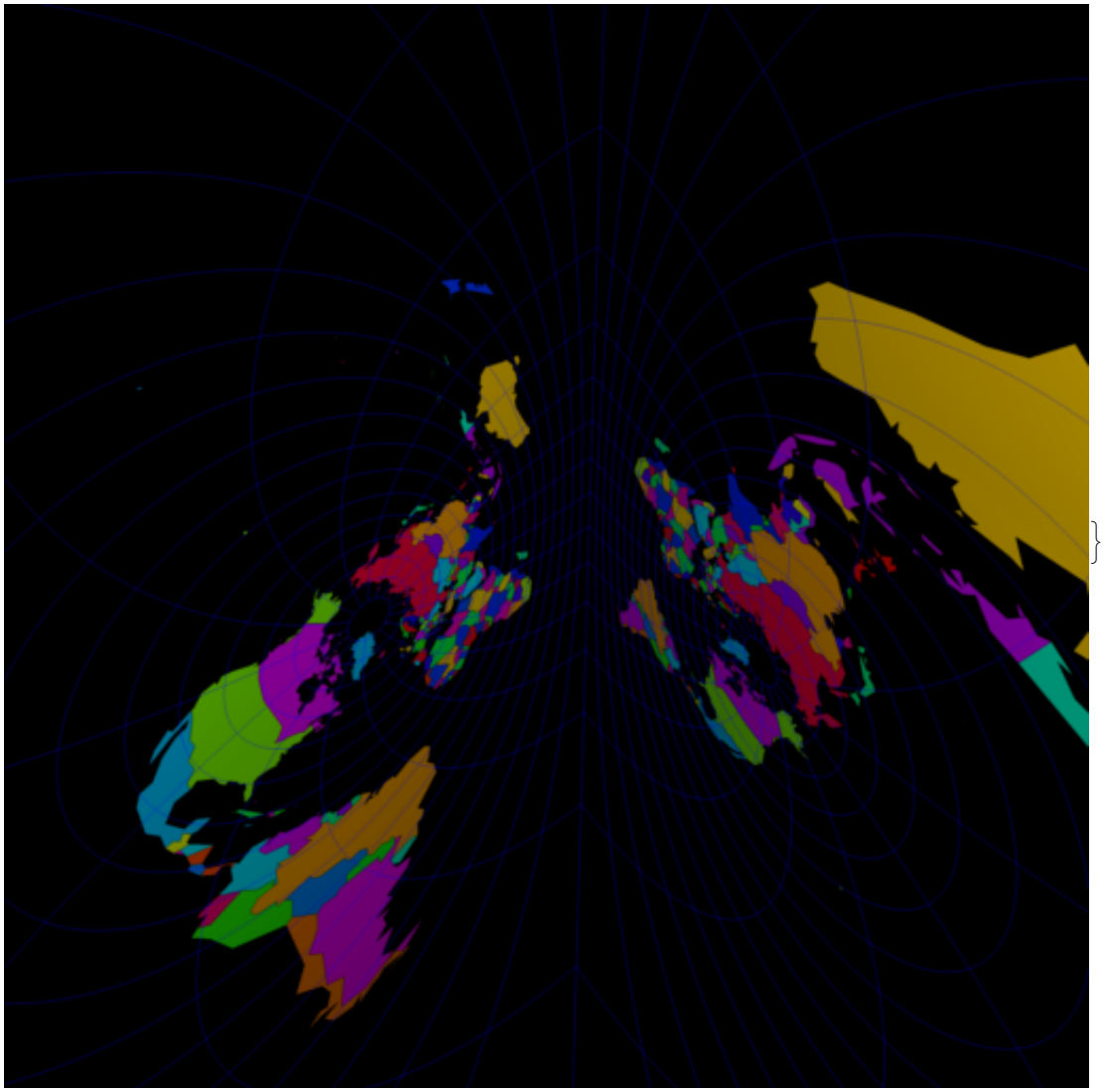
{3.765,  }

```
False && SaveColourScheme[]
```

False

```
beta = (240 + 1 / Sqrt[5]) Degree;
MakeImage["FramingExercise", Graphics3D[{
   Whirl[#,
      WhirlBottom → 40 Degree, WhirlTop → 320 Degree, WhirlingSteps → 0
     ] & /@ AllCountries,
   grid
  }]]
```

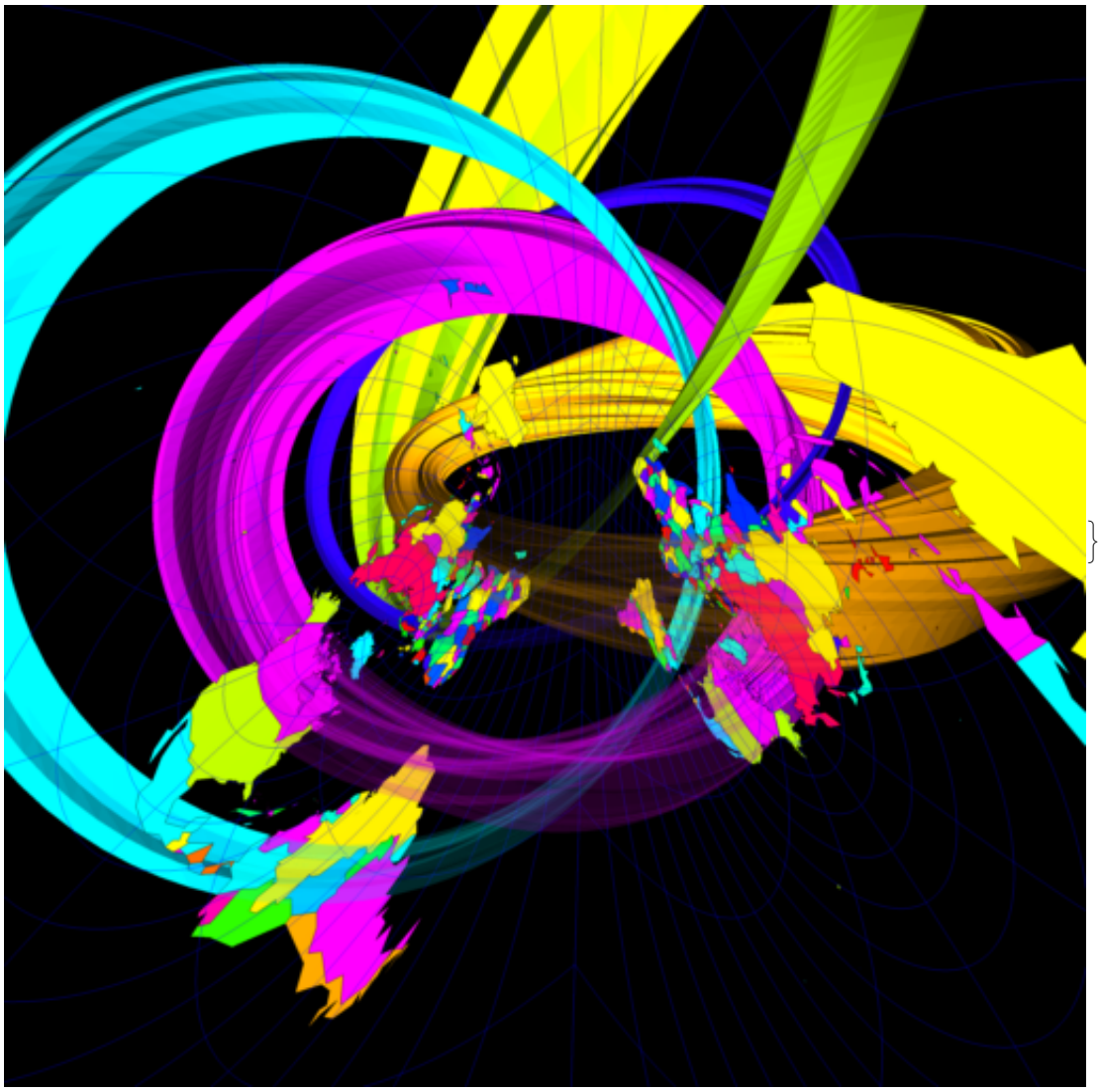
{14.078,



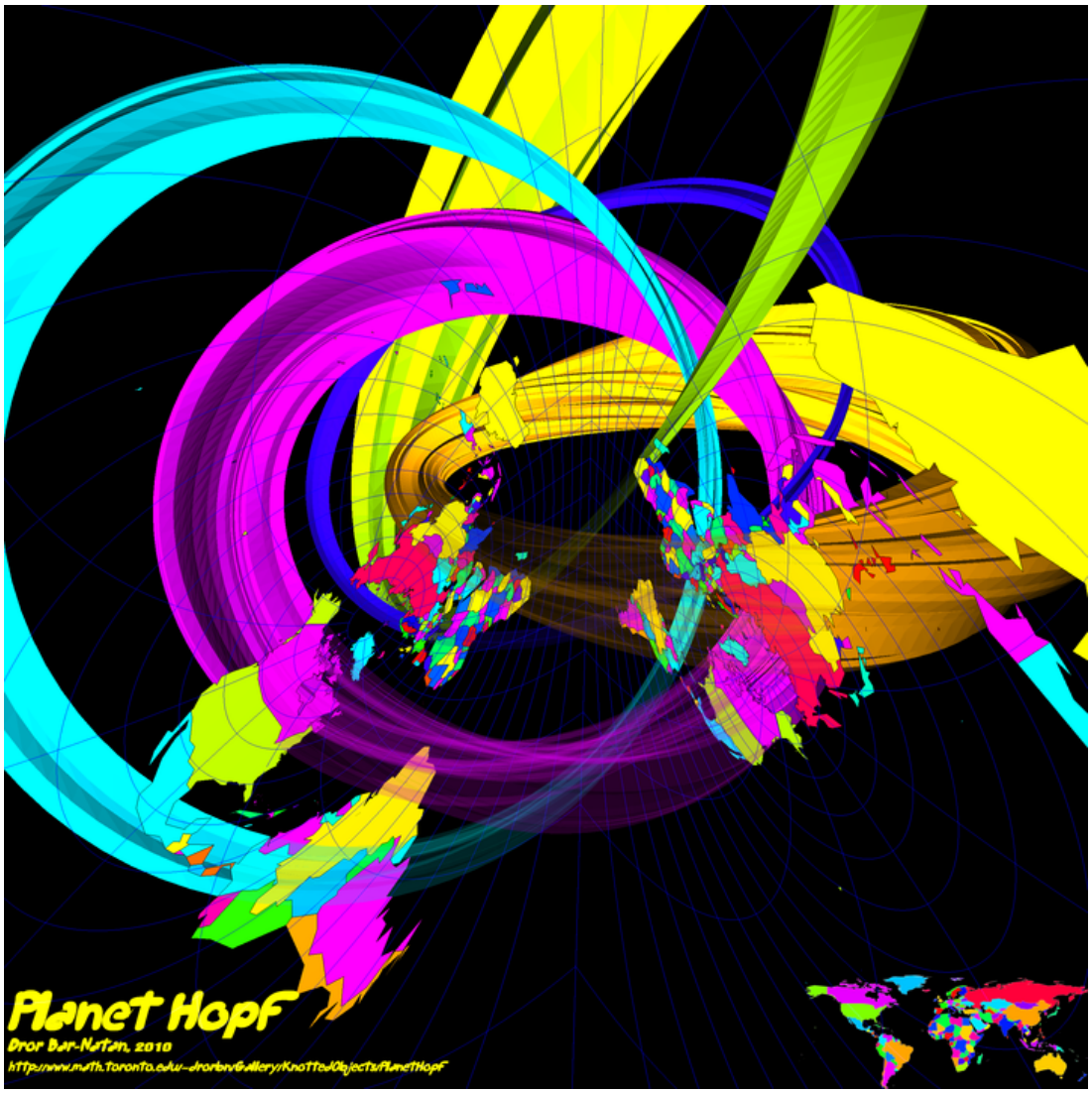
}

```
newwhirl := {
   Whirl[#,
      WhirlBottom → 40 Degree, WhirlTop → 320 Degree, WhirlingSteps → 120,
      WhirlRegions → If[# === "Japan", 4, 1],
      TopStyle → {Glow[Hue[CountryColour[#]]]},
      BottomStyle → {Opacity[1]}
     ] & /@ solids,
   Whirl[#,
      WhirlBottom → -40 Degree, WhirlTop → 40 Degree,
      WhirlRegions → If[# === "Japan", 4, 1],
      WhirlStyle → {Opacity[0.1]}, (* was 0.2 *)
      TopStyle → {Opacity[0]}, BottomStyle → {Opacity[0]}
     ] & /@ ghosts,
   Whirl[#,
      WhirlBottom → -40 Degree, WhirlTop → 40 Degree, WhirlingSteps → 0,
      TopStyle → {Opacity[1], Glow[Hue[CountryColour[#]]]},
      (* was Opacity[0.5] *)
      BottomStyle → {Opacity[1], Glow[Hue[CountryColour[#]]]}
      (* was Opacity[0.5] *)
     ] & /@ Complement[AllCountries, {}],
   grid
  };
```

```
beta = (240 + 1 / Sqrt[5]) Degree;
MakeImage["NewWhirl", Graphics3D[newwhirl]]
```

{57.438,  }

```
Run["convert -resize 640x640 BaseMap.png BaseMap_640.png"];
Run["convert NewWhirl.png BaseMap_640.png -gravity
    SouthEast -compose lighten -composite PlanetHopf2.png"];
Run["convert PlanetHopf2.png Label.png -gravity SouthWest
    -compose lighten -composite PlanetHopf2.png"];
Run["convert -resize 120x120 PlanetHopf2.png PlanetHopf2_120.png"];
Run["convert -resize 720x720 PlanetHopf2.png PlanetHopf2_720.png"];
Run["convert -resize 240x240 PlanetHopf2.png PlanetHopf2_240.png"];
Show[
 Import["PlanetHopf2_720.png"],
 ImageSize → 512
]
```




```
Dynamic[Show[frame, ImageSize → 512]]
```

```
Show[frame, ImageSize → 512]
```

```
Do[
 fname = StringJoin @@
   Flatten[{"Frames2/", ToString /@ IntegerDigits[n, 10, 3], ".png"}];
 beta = (n + 1 / Sqrt[5]) Degree;
 frame = Rasterize[
   Graphics3D[newwhirl, ImageSize → 720],
   RasterSize → 720, ImageSize → 720
  ];
 Export[fname, frame],
 {n, 0, 359}
]
```