

Apophysis :- An Intermediate User Guide

Ву

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Introduction

Welcome to my intermediate user guide to using the great freeware application called **Apophysis**, also affectionately known as 'Apo'. I first downloaded this software on December 5th 2005 and I have been hooked on it ever since. The variety of fractals it is able to produce is only limited by your creativity but saying that, your creativity amounts to nothing if you fail to persevere despite the lack of documentation out there. The definitive starter guides are those by Lance and for scripting, by Datagram. Links to both (and much more useful stuff) can be found at The Fractal Farm website: http://www.woosie.net/fracfan/viewtopic.php?t=15

These guides help you with the GUI and offer some basic advice on creating fractals. This guide is different. Together we will create specific flames so you can see how they are done. By doingthis I hope you will gain a better understandiing of Apo and use the knowledge to create your own fractal wonders © It is not intended to teach you the basics of the GUI, those are covered in the docs linked at The Fractal Farm. It will show you a few tricks that you may not be aware of.

I do not profess to be any kind of expert with the software. On the contrary, there is still much I have to learn. So please take this document for what it is – a guide.

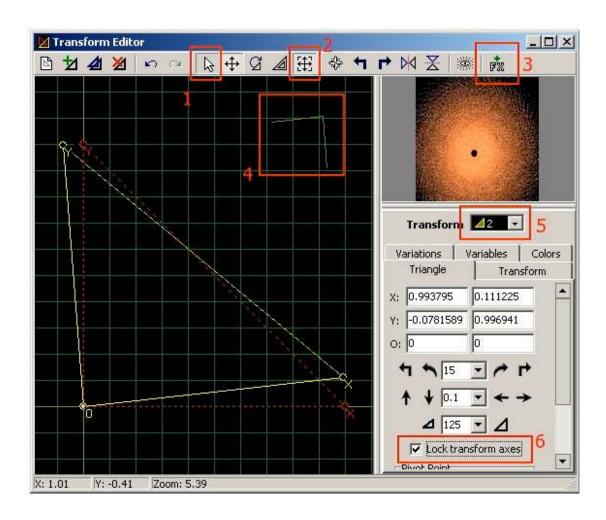
The version of Apophysis I will be using for this guide will be the much anticipated $\bf 2.04$. I say much anticipated as I am lucky enough to be a beta tester. I continually interchange the words triangle and transform so don't be confused by the switch, they mean the same. Apart from several new variations, 2.03d implements better memory management options when rendering an image to file so this may allow you to create larger images than you may have been able to previously. There is a trade off in that larger images take much longer to render. Although you would obviously expect this, the render times may come as a shock. On my system (Win2K Athlon 64 1.5GB) an 8000×8000 image at Q500, FR 0.4 and O/S 2 would take 22 hours approx whereas a 12000×12000 image would take 160hrs with the same settings.

Finally, please show respect for the artwork we are about to produce. Don't simply recolour it and try and pass it off as your own work – as great as it might look. Use the knowledge you gain here to fuel your imagination.

Now let's get cracking!

Working with the Editor

There are several changes to the editor in 2.03d. We will cover them now. Apart from the new variations (covered later) the following image shows the most obvious ones:



1. The selection cursor button.

This isn't new I hear you say. Yes but this section is about more than new stuff, I hope to show you little tips to make life easier. The first one involves the selection cursor. How many time have you created a flame where all the triangles are fairly close so selection of one of them, or its control points, is difficult?

Tip No.1

Use the + / - keys on your numpad to identify the triangle you want (shown both at 5 in the image above and in the editor main window) to work with. Once you have done this click on the selection cursor button and you will ONLY manipulate the chosen

triangle and it's control points. Saves lot's of fiddling ②. Just enable cursor selction (by clicking the button again) when you are ready.

2. Extended Edit Mode

This really is neat! By clicking this button you enable one click manipulation of triangles. If you pass your cursor over the active triangle you will square corners, as shown by 4 in the image above. The corners when dragged, rotate the triangle. In addition you can also do the following:

- a) Place the cursor over any of the sides of the triangles. You will see that two of the sides are full lines and the third is made up of dashes. When the cursor is over any of the full lines, dragging it will rotate **that side only**. Dragging the cursor whilst over the broken line (xy) will scale the triangle.
- b) Try this: select and drag one of the control points from a new triangle. Now you realise you didn't want to do that. Rather than using Ctrl-Z, double click on the control point. It will return to its default position.

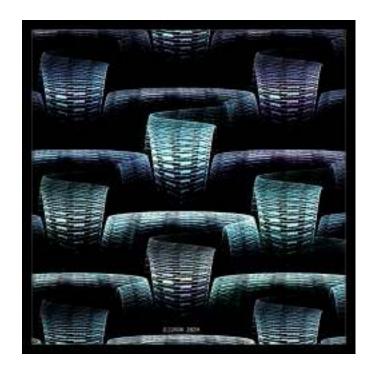
3. Enable Final Transform (aka Final Xform)

This has to be the biggest change to Apo and it will breathe life into old flames – trust me ©

What is it?

Put simply. Clicking this button will add another white triangle to your flame. It will be in the default position with a variation of linear, set to 1 as with all new triangles. How this differs is this. Before when you manipulate a triangle (either by scaling, rotating or changing the variations) the effect on the flame was confined to the part of the flame directly influenced by that particular transform. Still with me? Good. If not you'll soon pick it up. Just read on. Now making any changes with the Final Xform will affect the **whole** flame and not just a part of it. Let me show you an example.

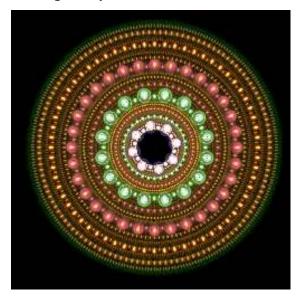
The following image, called Heavy Duty is a tiled fractal which could have been created in any version of Apo:



Now, using the Final Xform with a spherical variation setting (only) you get this:



Here's another before – a standard Julia Pattern (which, incidentally, is a pattern type we'll be covering later) :-



And after applying the Final Xform with the handkerchief variation (again only this):-



As you can see using the Final Xform has a **major** impact on your results and if nothing else, I encourage you to experiment with this.

There are a few things you need to know about the Final Xform. Firstly, only one can be applied (in this version) to your flame. This may change in the future. Secondly, to remove the effect, just click on the Enable Final Transform button again. The triangle still shows in the editor window. If you don't want this then the only way to remove it is to delete the Final Transform in the same way you delete other triangles. This will of course delete any settings you had in the Final Xform. Incidentally, the Final Xform is clearly labelled in the editor drop down (marked 5 in the editor screen shot at the start of this paper) so you alway know when it's selected.

Note regarding scripts and the Final Xform:

Often when running a script it will add a Final Xform to your flame. Do not worry about this as it does not have any effect **unless you manipulate it**. If you do not intend to use it just delete it in the usual way.

5. Lock transform axes

When rotating a transform with this checked the **whole** transform moves as you have been used to. Uncheck it and **only** the side of the transform selected will move. In effect distorting it.

6. New variations

With this latest release comes several new variations. They are:

- a. noise
- b. blur
- c. julian
- d. juliascope

You will also notice that the last few in the list of variations are on a coloured background (this includes some of the variations in previous versions). If you select any of these it means they can be further adjusted by tweaking the values in the **variables** tab. This is also handy as I had never really explored this before.

I must admit, of the new variations I have used julian the most, followed by blur. Blur has been used by some artists namely Psion005 (psion005.deviantart.com) and Zueuk (zueuk.deviantart.com) with spectacular results. Grinagog (grinagog.deviantart.com) has an image in his 'scraps' at deviantArt that shows he is very close too and by the time this doc is complete, he may have resolved the problem.

I will show how to use the julian and, to a VERY limited extent, blur. I haven't really taken to any of the others so I won't be writing anything more about them.

Whilst we are talking about variations here's another tip or group of tips ©:

Tip No.2

When changing the values in the variations section of the editor try the following:

- a) place the cursor over the variation name you want to change. The cursor changes to a hand
- b) click the left mouse button and drag left to reduce the value and drag right to increase it. The amount goes into three decimal places
- c) For other tuning hold down the following keys:
 - i) Shift 2 decimal places
 - ii) Ctrl 4 decimal places
 - iii) Alt 5 decimal places
- d) double click on the variation name to zero the value

This about does it for the Editor – at least until we get on to adding colour to the flames.

Using My Metallica Script

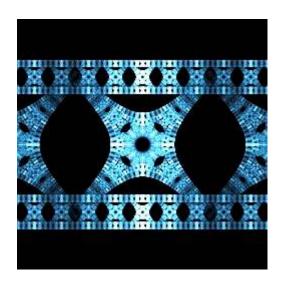
Below is the latest version of my Metallica script. This code produces a specific type of fractal which can be pin sharp and colourful. I discovered this technique quite early in my Apo days (lol, not as though I've been using it for years) and I was dumbstruck when I saw the result. I soon realised this lended itself perfectly to scripting so I wrote one;)

```
Metallic Strip Script - Version 4
by Carl Skepper 9th April 2006
web: www.ivy-cottage.net
aka 2B2H (2b2h.deviantart.com)
email: carl.skepper@ivy-cottage.net
Objective: To create a horizontal tiling effect with narrow upper
and lower strips made up of smaller versions of the original flame
http://www.ivy-cottage.net
**************************************
h1 := 2; //horiz spacing
v1 := 1; // vert spacing
s1 := 20; // scale (for upper and lower bands)
clearFlame := 'y'; // flag for user choice - apply to current flame or start a new one
if not InputQuery('Metallica v4','Do you want to clear the current flame? (y/n). The
default is "y":',clearFlame)then
exit:
if not InputQuery('Metallica v4', 'Horizontal Spacing (Between 1 and 5, suggest 2):',
h1) then
exit:
if not InputQuery('Metallica v4', 'Vertical Spacing (Suggest half of horiz spacing):',
v1) then
exit:
if not InputQuery('Metallica v4', 'Scale factor % (try 20 to start):', s1) then
s1 := s1 * 0.01;
// If the user wants to start a new flame - clear the old one and add two new
transforms
if (clearFlame = 'y') or (clearFlame = 'Y') then
begin
 Clear;
 AddTransform;
 AddTransform;
 Rotate(180);
end;
```

```
// Add the strip creation transforms
// The first 4 dictate the horizontal spacing of the pattern
AddTransform;
Transform.e := Transform.e + h1;
CopyTransform;
Rotate(180);
AddTransform:
Transform.e := Transform.e - h1;
CopyTransform;
Rotate(180);
// The next 4 dictate the vertical spacing and how narrow the edge bands are
AddTransform;
Transform.f := Transform.f - v1;
Scale(s1);
CopyTransform;
Rotate(180);
AddTransform;
Transform.f := Transform.f + v1;
Scale(s1);
CopyTransform;
Rotate(180);
// Reset Symmetry as new transforms and even out the weights as new transforms
may have symmetry set at 1
For n:= 0 to Transforms-1 do
begin
 SetActiveTransform(n);
 With Transform do
 begin
  Weight := 0.5;
  Symmetry := 0
 end:
//*************
```

Previous users of this script will notice some changes. Firstly I have added the option to apply the script to a current flame. I haven't used this much so it's effect isn't tried an tested. To revert to the 'old' method, just leave the 'y' at the first prompt. The second change is that the starter variation is always linear. I have removed the random variation code because I think it restricted the use as users were finding the same fractal often. This was because at the time the 'random' variation was only random in the sense it was one of the 32 or so variations possible with the version of Apo I was using. By removing this code it will force users to experiment and with this in mind, lets create a flame using it. The final change to the script was the suggested values shown at the promts are now the defaults.

- 1. Step 1 run the script and leave the default values
- 2. This will give a linear and not well defined flame. If you don't see anything then try changing the gradient. Sometimes the random gradient chosen by Apo is so bad you don't see anything in the preview window
- 3. Make the linear variation 0 and the Julia variation 1 in both Transform 1 and 2
- 4. This will give a better fractal but it's still not best ever. Now using the method from **Tip No. 2** reduce the value in the Julia variation in both triangles and you will get a sharp flame. Values around 0.3 or 0.4 did it for me. The following image is the result:



How it works

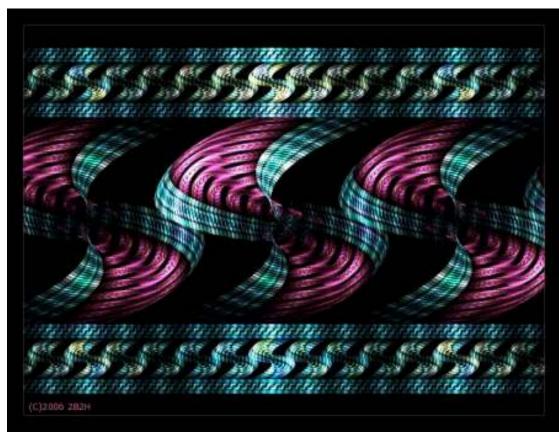
The first two triangles are used to create the basic pattern. The remaining 8 dop nothing other than tile the pattern in a specific way. These 8 triangles all have the same variation of linear=1. So to change the fractal you only really need to change the first two triangles. You can do more if you like to alter the spacing. However, changing anything in the 8 'linear' triangles destroys the effect. To change the spacing of the top and bottom bands just move the top and bottom pairs of triangles (Transforms 7,8,9 and 10) up or down. If you remember when you started the script you were asked for horizontal and vertical spacings. You could enter different values to see the effect.

That's really all there is to this script. The emphasis is on scaling the first two triangles to focus the fractal. Try using multiple variations and you can get some really cool fractals using this. I called these fractals 'Watch Straps' as that is what they reminded me of. Here are a few I created using the above method:





And the final (finest?) example:



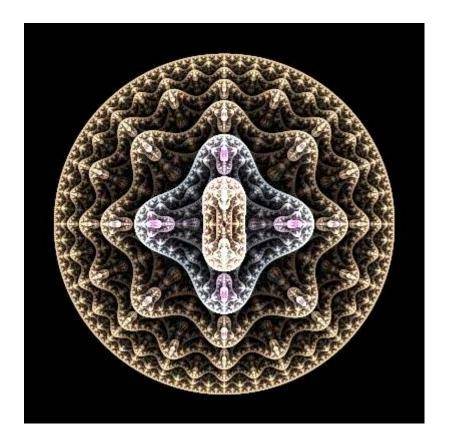
Falling in love with Julia (and Julia n)

I have a confession to make. I love this variation \odot . There, it's out. Don't tell the wife.

I find this one of the easiest variations to work with and I go through phases where I will create fractals which are heavily reliant on this variation. Julia variation was in previous versions of Apo. Julian (Julia n) is new. Julian basically gives you much greater control over the Julia fractal. We will now create a flame using Julia then repeat the starting steps with Julian and makes some neat modifications ©.

Step by Step Instructions.

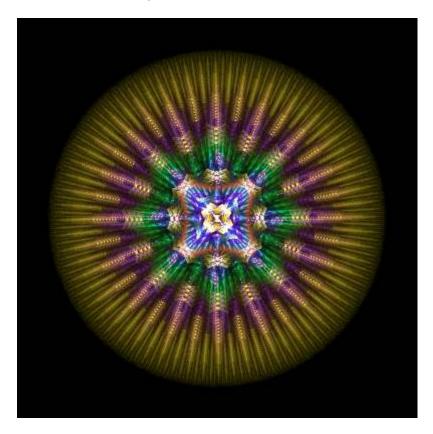
- 1. Create a New Blank Flame using the toolbar button in the Editor.
- 2. Select transform 1 and flip it horizontally. This is to make it easier to work with other transforms more than anything.
- 3. In both triangles set linear variation to 0 and **julia** to 1. The preview should show a perfect circle.
- 4. Add a third triangle. Set Julia to 0.25 and move it vertically 0.5 units.
- 5. You should already see a change in the preview. Depending on your gradient you should see something similar to the following:



You could simply play with the variation setting in these transforms to create numerous flames. To create 'satellites' around this image do the following:

- 6. Add Transform
- 7. Set linear to 0 and Julia to 0.75
- 8. Move this triangle 4 units upwards.
- 9. Copy it
- 10. Hit the space bar. This will now force any rotation about the origin 0,0
- 11. Rotate the copy 180 and you will now have 4 satellites. Making further copies and rotating them by varying amounts will add more but possibly at a cost of reduction of colour variation.

By experimentation you will achieve a lot of fractals using this technique as a basis. Here are some examples:



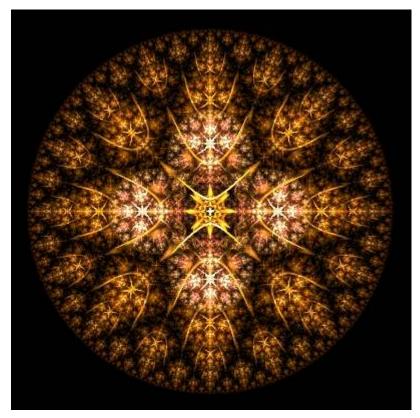
Here is the parameter file for you you examine:

```
<flame name="2b2hUrchin" size="400 400" center="0.00840142659615006 0.000754844302416124"
scale="54.34" angle="0.796742803535411" rotate="-45.65" zoom="-0.359" oversample="1"
filter="0.1" quality="50" background="0 0 0" brightness="24.4" gamma="2.68" >
 <xform weight="0.5" color="0" julia="2" coefs="-1 0 0 1 0 0" />
 <xform weight="0.5" color="1" julia="0.75" coefs="0.2 -0.5 0.2 0.5 0 0" />
 <xform weight="0.5" color="1" symmetry="1"sinusoidal="0.029" coefs="-0.256 -0.256 -0.256 0.256</p>
0 -1"/>
 <xform weight="0.5" color="0" julia="2" coefs="0.8 0 0 -0.8 0 0" />
 <colors count="256"
data="00E5DE2C00E7DD2E00E9DC2F00ECDC3000EEDB3200F0DA3300F3D93400F5D836
  00F7D83700FAD73900FCD63A00F9D03F00F6CB4400F4C54900F1C04E00EEBA53
  00ECB45800E9AF5D00E6A96200E3A46700E09E6C00DE987100DB937600D88D7B
  00D6888000D3828500D07C8A00CD779000CA719500C86C9A00C5669F00C261A4
  00C05BA900BD55AE00BA50B300B74AB800B445BD00B23FC200AF39C700AC34CC
  00AA2ED100A729D600A423DB00A129D5009E30CF009B36CA00983DC4009543BE
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  007A7D8A0077838400748A7E00729079006F9673006C9D6D0069A3670066AA62
  0063B05C0060B656005DBD50005AC34A0057CA450054D03F0051D639004EDD33
  004BE32E0048EA280045F0220045E9280044E32F0044DC350043D53B0043CF41
  0042C8480042C14E0042BA540041B45B0041AD610040A6670040A06D003F9974
  003F927A003E8C80003E8586003E7E8D003D7893003D7199003C6AA0003C64A6
  003B5DAC003B56B2003A50B9003A49BF003A42C500393BCC003935D200382ED8
  003827DE003721E500371AEB003D1CE500431FDE004A21D8005023D2005625CC
  005C28C500622ABF00692CB9006F2EB2007531AC007B33A6008135A000883799
  008E3A9300943C8D009A3E8600A0408000A6437A00AD457300B3476D00B94967
  00BF4C6100C54E5A00CC505400D2524E00D8554700DE574100E4593B00EB5B35
  00F15E2E00F760280002D6EB0006CFEB0009C9EB000DC2EB0011BCEC0014B5EC
```

0018AEEC001CA8EC001FA1EC00239AEC002794ED002A8DED002E86ED003280ED 003579ED003973ED003C6CEE004065EE00445FEE004758EE004B52EE004F4BEE 005244EE00563EEF005A37EF005D30EF00612AEF006523EF00681CEF006C16F0 00700FF0007309F0007702F0007402F0007102F0006E02F0006B03F0006803F0 006503F0006203F0005F03F0005C03F1005904F1005604F1005304F1005004F1 004D04F1004A04F1004804F1004505F1004205F1003F05F1003C05F1003905F1 003605F1003306F1003006F2002D06F2002A06F2002706F2002406F2002107F2 001E07F2001B07F2001807F2001D0EEB002216E400261DDD002B24D600302BCE 003533C700393AC0003E41B9004349B2004850AB004D57A400515E9C00566695 005B6D8E0060748700647C8000698379006E8A720073916B00789964007CA05C 0081A7550086AE4E008BB6470090BD400094C4390099CC32009ED32A00A3DA23 00A7E11C00ACE91500B1F00E00B3EF0F00B6EE1100B8EE1200BAED1400BDEC15 00BFEB1600C1EA1800C4EA1900C6E91A00C8E81C00CBE71D00CDE61E00CFE520 00D2E52100D4E42300D6E32400D9E22500DBE12700DEE12800E0E02A00E2DF2B"/></flame>

Note: In order to use the params in version 2.03c and earlier you need to remove the spaces in the data section. Copy them into notepad (or similar), delete the spaces then copy and paste the parameter details into Apo in the normal way.

The next example is one of my 'deviations' at DeviantArt.com and is titled Solarity. It is on the next page.

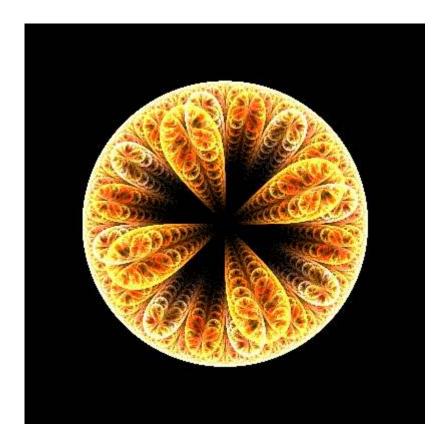


```
<flame name="2B2HSolarity" size="400 400" center="0.0259883114496029 -0.0318311410914605"
scale="104.31" zoom="-1.191" oversample="1" filter="0.1" quality="50" background="0 0 0"
brightness="36.8391304347826" gamma="2.68" >
 <xform weight="0.5" color="0" julia="2" coefs="1 0 0 -1 0 0" />
 <xform weight="0.5" color="0.25" julia="2" coefs="1 0 0 1 0 0" />
 <xform weight="0.5" color="0.5" linear="-0.008" julia="0.792" coefs="0.38017 0.010323 0.391165</pre>
0.001986 -0.468796 -0.128315" />
 <xform weight="0.5" color="0.75" linear="-0.008" julia="-0.066" coefs="-0.012309 -0.270788</p>
0.05744 -0.246171 -0.002467 -0.003113" />
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 <colors count="256"
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  00F42D0800F3320900F2370A00F13C0B00F0410C00EE460D00ED4B0E00EC4D0E
  00EC500E00EA5A1000E85F1100E7641200E6691300E56E1400E4701400E47315
  00E17D1600E0821700DF871800DE8C1900DD911A00DC931A00DB961B00DA9B1C
  00D9A01C00D89D1E00D89B1F00D89A2000D7982000D7972100D7962100D79622
  00D6922400D5912500D5902600D58E2600D58C2700D48B2700D48B2800D48A29
  00D4882A00D3852C00D2832C00D2822D00D2802E00D27F2F00D17E2F00D17E30\\
  00D17A3100D0793200D0783300CF763400CF743500CF733500CF733600CE7237
  00CE703700D1713400D2713200D4723000D5722F00D6722E00D7732D00D9732B
  00DC742800DD742600DF752400E0752200E2762100E2762000E3771F00E5771D
  00E6781C00EA791800EB791600ED7A1500ED7A1400EE7A1300F07B1100F17B0F
  00F47C0C00F57C0A00F77D0900F87D0800F97E0700FA7E0500FC7F0300FD7F02
  00FF800000FA7E0000F77C0000F57B0000F47A0000F37A0000F0780000EE7700
  00E9750000E6730000E4720000E2710000E1710000DF700000DC6E0000DA6D00
  00D86C0000D36A0000D1690000D0680000CE670000CB660000C9640000C66300
  00C1610000BE5F0000BC5E0000BB5D0000BA5D0000B75C0000B55A0000B25900\\
  00B0580000B55F0800B6600A00B7620C00BA651000BC681500BF6C1900C16F1D
  00C6762500C8792900CB7C2D00CC7D2F00CE7F3200D0833600D3863A00D5893E
  00D88C4200DC934A00DD944C00DF964E00E19A5200E49D5700E6A05B00E9A35F
  00EEAA6700EFAB6900F0AD6B00F3B16F00F5B47400F8B77800FABA7C00FDBE80
  00FFC18400FFBA8000FFB87F00FFB67F00FFB27D00FFAE7B00FFAB7900FFA777
  00FFA07400FF9E7300FF9C7200FF987000FF946E00FF916C00FF8D6B00FF8969
  00FF866700FF826500FF7E6300FF7A6200FF776000FF735E00FF6F5C00FF6B5A
  00FF645700FF625600FF605500FF5D5300FF595100FF554F00FF514E00FF4E4C
  00FF4A4A00FE4D4B00FC4F4C00FB524C00FA544D00F8574E00F75A4F00F55C4F
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  00E9745600E8765600E6795700E57B5800E47E5900E2805900E1835A00DF865B
  00DE885B00DD8B5C00DB8D5D00DA905E00D8935E00D7955F00D6986000D49A60
  00D39D6100D39E6300D49F6400D4A06600D5A16800D5A26900D6A36B00D6A46C
  00D6A56E00D7A67000D7A77100D8A87300D8A97400D9AA7600D9AB7800DAAC79
  00DAAD7B00DAAE7D00DBAF7E00DBB08000DCB18200DCB28300DDB38500DDB486
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</flame>
```

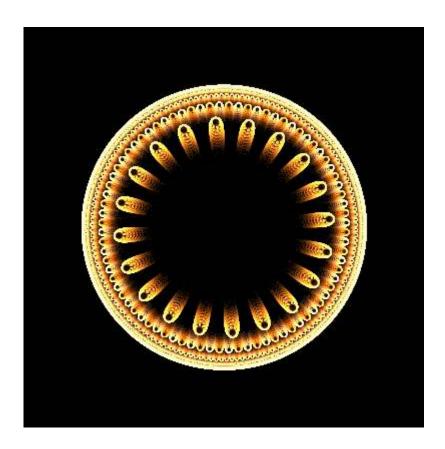
I think these should give you enough examples on how you can use the Julia variation. Now for something with a bit more control - **Julian**

Step by Step – Julian

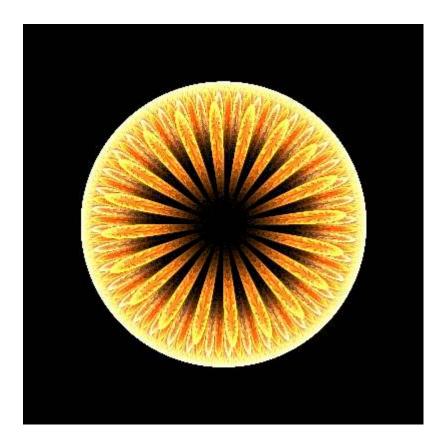
1. Repeat steps 1-5 above, replacing **Julia** with **Julian**. At step 4 move the newly added triangle 1 unit instead of 0.5. This is what I get (remember you may have something different depending on your gradient):



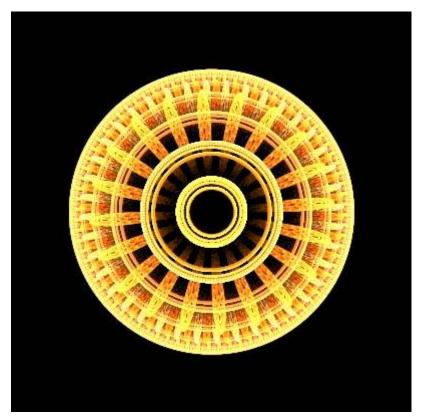
Now the fun bit © Switch to the **variables** tab. We are only interested in the **julian_power** and **julian_dist** values. Change the value in julian_power to any integer (whole number) – say 8 and watch the change in the preview. Here is what I get with a value of 20 (!):



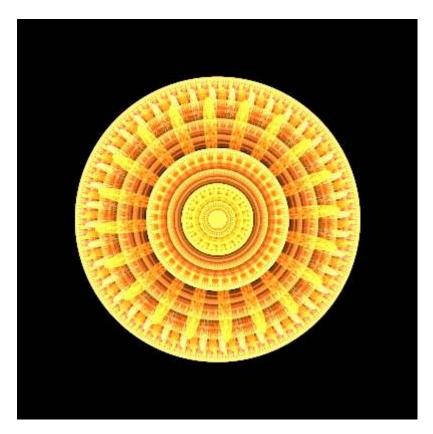
Starting to look interesting eh? The middle is a bit bare so lets try and put some interest there. Entering 4 in Julian_Dist does this to the previous image (see image, next page). Again you can experiment with values here (they have no need to be integer btw). Some **really** cool stuff can be done with these settings, but we haven't finished with our flame just yet



The middle is still not complete so lets add interest. Add another transform. This time after removing the linear (set it to 0), set julian at 0.5 without moving it. This is my result:



Now this is getting interesting. Time to tweak some more.... Set both the Julian_Power and Julian_Dist variables to 1. This fills the middle nicely:



This gives you an insight into the power on Julian. Here is the param file for the previous image:

```
<flame name="2B2HJulian" size="400 400" center="-0.00173617559048694 -
0.000126149121412233" scale="142.375" oversample="1" filter="0.1" quality="50" background="0 0
0" brightness="36.8391304347826" gamma="2.68" >
 <xform weight="0.5" color="0" julian="1" coefs="-1 0 0 1 0 0" julian power="2" julian dist="1" />
 <xform weight="0.5" color="1" julian="1" coefs="1 0 0 1 0 0" julian_power="2" julian_dist="1" />
 <xform weight="0.5" color="0" julian="0.75" coefs="1 0 0 1 0 -1" julian power="20"</pre>
iulian dist="4"/>
 <xform weight="0.5" color="0" julian="0.25" coefs="1 0 0 1 0 0" julian power="1" julian dist="1"</pre>
 <colors count="256"
data="00FF000000FD0A0200FB0F0300FA140400F9190500F81E0600F7200600F72307
  00F42D0800F3320900F2370A00F13C0B00F0410C00EE460D00ED4B0E00EC4D0E
  00EC500E00EA5A1000E85F1100E7641200E6691300E56E1400E4701400E47315
  00E17D1600E0821700DF871800DE8C1900DD911A00DC931A00DB961B00DA9B1C
  00D9A01C00D89D1E00D89B1F00D89A2000D7982000D7972100D7962100D79622\\
  00D6922400D5912500D5902600D58E2600D58C2700D48B2700D48B2800D48A29\\
  00D4882A00D3852C00D2832C00D2822D00D2802E00D27F2F00D17E2F00D17E30\\
  00D17A3100D0793200D0783300CF763400CF743500CF733500CF733600CE7237
  00CE703700D1713400D2713200D4723000D5722F00D6722E00D7732D00D9732B
  00DC742800DD742600DF752400E0752200E2762100E2762000E3771F00E5771D
  00E6781C00EA791800EB791600ED7A1500ED7A1400EE7A1300F07B1100F17B0F
  00F47C0C00F57C0A00F77D0900F87D0800F97E0700FA7E0500FC7F0300FD7F02
  00 FF 800000 FA 7E0000 F77C0000 F57B0000 F47A0000 F37A0000 F0780000 EE7700\\
```

00E9750000E6730000E4720000E2710000E1710000DF700000DC6E0000DA6D00 00D86C0000D36A0000D1690000D0680000CE670000CB660000C9640000C66300 00C1610000BE5F0000BC5E0000BB5D0000BA5D0000B75C0000B55A0000B25900 00B0580000B55F0800B6600A00B7620C00BA651000BC681500BF6C1900C16F1D 00C6762500C8792900CB7C2D00CC7D2F00CE7F3200D0833600D3863A00D5893E 00D88C4200DC934A00DD944C00DF964E00E19A5200E49D5700E6A05B00E9A35F 00EEAA6700EFAB6900F0AD6B00F3B16F00F5B47400F8B77800FABA7C00FDBE80 00FFC18400FFBA8000FFB87F00FFB67F00FFB27D00FFAE7B00FFAB7900FFA777 00FFA07400FF9E7300FF9C7200FF987000FF946E00FF916C00FF8D6B00FF8969 00FF866700FF826500FF7E6300FF7A6200FF776000FF735E00FF6F5C00FF6B5A 00FF645700FF625600FF605500FF5D5300FF595100FF554F00FF514E00FF4E4C 00FF4A4A00FE4D4B00FC4F4C00FB524C00FA544D00F8574E00F75A4F00F55C4F 00F45F5000F3615100F1645100F0675200EE695300ED6C5400EC6E5400EA7155 00E9745600E8765600E6795700E57B5800E47E5900E2805900E1835A00DF865B 00DE885B00DD8B5C00DB8D5D00DA905E00D8935E00D7955F00D6986000D49A60 00D39D6100D39E6300D49F6400D4A06600D5A16800D5A26900D6A36B00D6A46C 00D6A56E00D7A67000D7A77100D8A87300D8A97400D9AA7600D9AB7800DAAC79 00DAAD7B00DAAE7D00DBAF7E00DBB08000DCB18200DCB28300DDB38500DDB486 00DDB58800DEB68A00DEB78B00DFB88D00DFB98E00E0BA9000E0BB9200E1BD95"/> </flame>

Tips

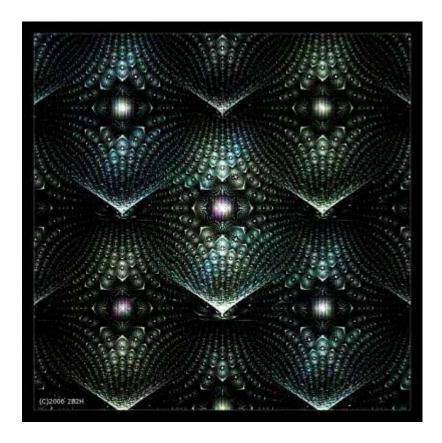
As I have already stated, I have used the julia /julian variation **a lot**. Here are a few ideas for you to try:

- a) Try adding triangles with different **julian** values. Larger values expand the flame diameter
- b) Try mixing **julian_powers** in the same flame they don't have to be the same value. Don't be afraid to try small values or larger ones like 64 or higher. Remember you can use whole numbers only in this field. Try negative values too ©
- c) Try mixing values for **julian_dist** too These can also be negative values
- d) Move the triangles further away from the centre. If the edge pattern gets too small just scale the triangle larger
- e) Try deforming the triangles.

We will be using the Julian again later but that should be enough to whet your appetite $\ensuremath{\odot}$

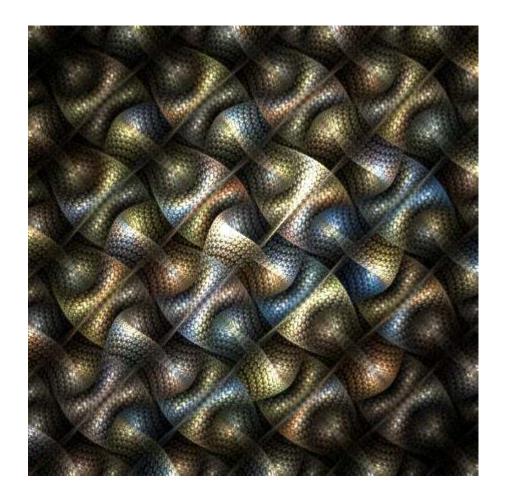
Tiling

I have kind of dreaded writing this section in particular because I don't yet feel its an area of Apo that I have sufficiently got to grips with. In addition to Zueuk, Psion005, Grinagog I would add MichaelFaber to the list of experts in this area. I think I have got close with some aspects but it's not guite there. Perhaps you will unlock the key? One of the most (if not **the** most) important aspects of repeating patterns is the placement of what I term the patternmaker transforms. These are the triangles that are placed to repeat the pattern. Going back to the Metallica script as an example. Of the 10 transforms created by that script, the last 8 are purely to repeat the pattern in a very precise way. After discovering this I figured this was the way to go to tile. At this time I am still very much experimenting and until I get it right I don't feel confident releasing any teachings on the subject. When i do eventually master it that should change. I apologise for any disappointment to those looking for a solution to mastering this technique. The only reason I have included this section is because tiling is a popular flame type and I reason that something should be included – even if it is somewhat negative at this time. However, all is not lost. What I will do is show a few images and give you the parameter files so you can get an idea as to how they were done. Who knows, maybe you can find the 'missing link' and tell me how to do them properly! Firstly my favourite in this series: Dragonscales



```
<flame name="2B2HDragonScales" size="398 333" center="-0.00177184531241925</p>
0.102881494418569" scale="140.98155" oversample="1" filter="0.1" quality="50" background="0 0
0" brightness="30" gamma="3" >
 <xform weight="0.5" color="0.937" linear="-0.014" coefs="1 0 0 1 0 0" />
 <xform weight="0.5" color="0.0058770002797246" linear="1" coefs="1 0 0 1 -0.75 -0.75" />
 <xform weight="0.5" color="0.490701110335067" linear="1" coefs="1 0 0 1 0.75 -0.75" />
 <xform weight="0.5" color="0.085411346051842" linear="1" coefs="1 0 0 1 0.75 0.75" />
 <xform weight="0.5" color="0.603561342461035" linear="1" coefs="1 0 0 1 -0.75 0.75" />
 <xform weight="0.5" color="0.625557366758585" symmetry="1"julia="-0.349" coefs="0.512 0 0</p>
0.5120 - 0.75" >
 <xform weight="0.5" color="0.683" symmetry="1"linear="0.721" polar="-0.848" coefs="-0.083886"</p>
0.145295 -0.145295 -0.083886 0 0.75" />
 <colors count="256"</pre>
data = "000C1A180015302D001F464300285D5A003173710039898900419DA00049B0B6\\
  0050C2CC0056B1CF005CA1D1006392D3006985D500707AD8007E77DA00947EDC
  00A985DE008F83E200818FE5007EAAE9007CC9EC0079EBF00076F3D70073F7B5
  0070FA8F0071F9940072F8990073F79D0074F6A20074F5A60075F4AA0076F3AE
  0077F2B20075DFC10071CCC8006CA9B8006689A5005E6E910056597E00514C6A
  004A4157003D3F5700394A570035585600305842002D582C0041582800595824
  00593D200051431A004A49150037421000253A0C0015330900082B0600032309
  00021C0D0005342C00093C4C000F2D65001C167D00561E95009E27AE00C6329B
  00DE3E6E00E341D5009145E7004860EB004CC8EF0050F3B60054F75500BBFB58
  00FFDB5C00B5EC550055D84E0046C488003FA4B00038579C00493189006A2A75
  00612346006E2E7400573A880048559B005793AF0068C2AE007AD69100A7E98D
  00EBFCA200E1E49500CCC58700B4A478009C876900836C5A006B544A00533E3A
  003B2A2A00494334004E573F004A664C0055746D0060728200716B910099769F
  00AD829500B67CB100A474C0007B6BC9006181D20055BADC0048E5C40039EE75
  0045F72A0051DD2B0058C32C005AA92B00578F28004F742400435A1E00344017
  0021260F0029311300303C160037481A003D531E00425E210046692400497527
  004C802A006689340080913E00999A4A00A2935600AB8E6400B38C7200BC8D81
  00C4919100BBAA800096B26F0060A86900519F9200446A96004C388D007F2D83
  007A234100761E75003C197300142B6F0010616C000C683900166508004D6105
  005E3802005057080029510E00134A19001743320019383D001B2536001E1B2F
  00241B290036253C004A2E50005F356400763B78008C3F8700A0429200B3439A
  00C7429E00C33CA300BE37A900B931AE00B42CB400A527AF009622AB00871EA6
  00781AA1007E22AA00852CB4008C36BD009441C6009B4DD000A359D900AC67E2
  00B575EB008063D9005359C600446BB400377CA1002B8A8F00207C650017693C
  0010571B00135B240017602E001B64380020684200256D4D002A7157002F7662
  00357A6C002C66740024436D001C1F67002F156000460F5A00540A4A004D0528
  004701080058052000690C3E007A1461008B1E890085299C007C37AD007146BE
  006857CF004C56BE004164AD00386F9B002F768A00267978001F675600185639
  00124521001A551D002F6523004B762E006B863B008D964900A79E5800B79C69
  00C79B7B00B5986300A2994D0085903A005F7D2A003C6A1C001E58110008450C
  000333110008422F000F4E5200184162002330710042308100713F9100A050A1
  00B0639300B85AB700994FC0006A43C8003642D0002875D80019B8E00009E8C4"/>
</flame>
```

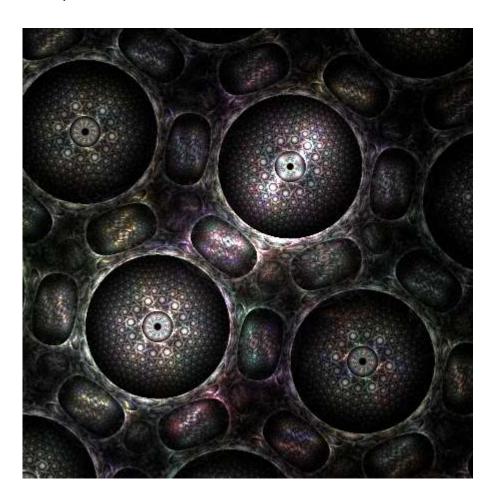
Next, a previously unplublished flame:



```
<flame name="2B2H-Tiling2" size="398 333" center="-0.00274961403875462 -
0.000868652739079323" scale="87.7789" oversample="1" filter="0.1" quality="50" background="0 0
0" brightness="30" gamma="3" >
 <xform weight="0.5" color="0.672973338747397" linear="1" coefs="0.1.1.0.0.1.010017" />
 <xform weight="0.5" color="0.857" linear="1" coefs="1 0 0 1 -1 0" />
 <xform weight="0.5" color="0.234370272373781" linear="1" coefs="-1 0 0 -1 1 0" />
 <xform weight="0.5" color="0.00220772158354521" linear="1" coefs="0 -1 -1 0 0 1" />
 <xform weight="0.5" color="0.471299953060225" linear="1" coefs="1 0 0 1 0 0" />
 <xform weight="0.5" color="0.340553615707904" linear="1" coefs="-1 0 0 -1 1 -1" />
 <xform weight="0.5" color="0.427122345892712" linear="1" coefs="1 0 0 1 -1 1" />
 <xform weight="0.5" color="0.41815753467381" linear="1" coefs="-1 0 0 -1 0 0" />
 <xform weight="0.5" color="0.687" handkerchief="0.31" coefs="0.091904 -0.110284 -0.091904 -</p>
0.09453 -0.06849 -0.981838" />
 <xform weight="0.5" color="0.634" linear="0.1878" handkerchief="-0.16" coefs="0.167772 0 0</p>
0.167772 1.064728 -1.966305" />
 <colors count="256"
data="00C5CD4600E2E93800ECED3100D2D53000B8BE3000A0A63300819633005C8F32
  00638731008D772C00A9622100C44D1D00E0381B00FC251900DB222900BA2939
  009935490078435F00355B72000F657700006D7C0000737D0000679600005CAE
  000051C7000047DF00003EF800181998003439920052598C0089946100A8B153
  00C5CD4600E2E93800ECED3100D2D53000B8BE3000A0A63300819633005C8F32
  00638731008D772C00A9622100C44D1D00E0381B00FC251900DB222900BA2939
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  00C5CD4600E2E93800ECED3100D2D53000B8BE3000A0A63300819633005C8F32
  00638731008D772C00A9622100C44D1D00E0381B00FC251900DB222900BA2939
  009935490078435F00355B72000F657700006D7C0000737D0000679600005CAE
```

000051C7000047DF00003EF800181998003439920052598C0089946100A8B153 00C5CD4600E2E93800ECED3100D2D53000B8BE3000A0A63300819633005C8F32 00638731008D772C00A9622100C44D1D00E0381B00FC251900DB222900BA2939009935490078435F00355B72000F657700006D7C0000737D0000679600005CAE 000051C7000047DF00003EF800181998003439920052598C0089946100A8B153 00C5CD4600E2E93800ECED3100D2D53000B8BE3000A0A63300819633005C8F32 00638731008D772C00A9622100C44D1D00E0381B00FC251900DB222900BA2939 009935490078435F00355B72000F657700006D7C0000737D0000679600005CAE 000051C7000047DF00003EF800181998003439920052598C0089946100A8B153 00C5CD4600E2E93800ECED3100D2D53000B8BE3000A0A63300819633005C8F32 00638731008D772C00A9622100C44D1D00E0381B00FC251900DB222900BA2939 009935490078435F00355B72000F657700006D7C0000737D0000679600005CAE 000051C7000047DF00003EF800181998003439920052598C0089946100A8B153 00C5CD4600E2E93800ECED3100D2D53000B8BE3000A0A63300819633005C8F32 00638731008D772C00A9622100C44D1D00E0381B00FC251900DB222900BA2939 009935490078435F00355B72000F657700006D7C0000737D0000679600005CAE 000051C7000047DF00003EF800181998003439920052598C0089946100A8B153 00C5CD4600E2E93800ECED3100D2D53000B8BE3000A0A63300819633005C8F32 00638731008D772C00A9622100C44D1D00E0381B00FC251900DB222900BA2939 009935490078435F00355B72000F657700006D7C0000737D0000679600005CAE 000051C7000047DF00003EF800181998003439920052598C0089946100A8B153"/> </flame>

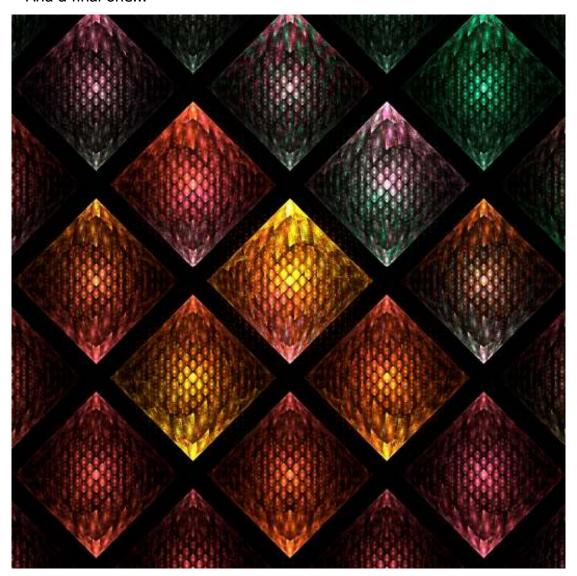
The next one (another deviation) shows a slightly different method of transform placement:



```
scale="81.7257882352941" angle="2.45009320394964" rotate="-140.38" zoom="-0.416"
oversample="1" filter="0.1" quality="50" background="0 0 0" brightness="5" gamma="3"
vibrancy="0" >
 <xform weight="0.3" color="0" linear="1" coefs="0.5 0.866025 -0.866025 0.5 0 -3" />
 <xform weight="0.3" color="0.1666666666666667" linear="1" coefs="1 0 0 1 0 -3" />
 <xform weight="0.3" color="0.3333333333333333" linear="1" coefs="-0.5 0.866025 -0.866025 -0.5</p>
0 - 3" />
 <xform weight="0.3" color="0.5" linear="1" coefs="-1 0 0 -1 0 -3" />
 <xform weight="0.3" color="0.66666666666666667" linear="1" coefs="-0.5 -0.866025 0.866025 -0.5</p>
0 - 3'' / >
 <xform weight="0.3" color="0.83333333333333333" linear="1" coefs="0.5 -0.866025 0.866025 0.5 0 -</p>
3" />
 <xform weight="0.6" color="1" julia="-0.265" coefs="0.733389 0 0 0.733389 0 0" />
 <xform weight="0.6" color="0.8333333333333333" linear="0.078" spherical="3.506" coefs="0.5 -</p>
0.866025 0.866025 0.5 0 -3" />
 <colors count="256"</pre>
data="00E8AE6400E5A06500E3926700DF7E8F00DB6BB700A04A7B00842D6600691052
  00641A48005F253E006C2736007A292F00A0263300911E490026083E001B115B
  00101A790023356F0036516600335A710030647C001395A2003F958B006C9575
  006E9F700071A96C0070B065006FB85F0075C75B007FC95600ECBD3100D48C20
  00BD5B1000A1461B008632270054240D003A0E0D003C0E11005F1A1E0082262B
  008C1F1E00971811008D292100843A31007F4E23006A4F310030580F00323E23
  0034253800343D410035554A0063755F00698A6D0096C05A00B1C17400CCC28F
  00C0BA8300B4B27700A1B8720085B6750067A576004DBD75003EAB4E003A9143
  00367838002F752F00287227002B7750003F8561004786370050953B005AA540
  005BB042005CBB450057C04A0053A55D007D9245007360360061431D005E3E28
  005B3A3300424E2800304C1C002254190022692D005F4F520071557400835B97\\
  007F689F007C75A80078B49A0078B677007DB18000719F9D0061585B0068436C
  006F2F7D00513E90002F2C71002A486E00284B810053475F0064594C00756B3A
  006D6F2E0065742300926A0B00C4781600C37723008A522100661F5900611959
  005C135A00390A5800181178000815A2000E189C0011616A00106E6300107C5C
  001F744D002E5F3200524825006A3527009B310100DD400B00EAB21500E9B728
  00E9BC3B00C4BF6E00A2C25D0095B56C007BB79E004A7FB1004B649A004D4984
  00601F5500451F34002029260000250A0000290500004E02000443180019460F
  00175F1D002468110025630D002B4E180046341000BA1D0E00C31D1900CC1D24
  00E0691700E6992F00EBB94600E4A65D00A58F77006F6379003D5A8200363C92\\
  001B19BC000B10CE000425E4000017C70014109800571D8D006B1F830066048D
  007F049200A4285E00A8282700BB131000C7332500974539007F8A4E00728160
  00478A6B0023765A000354570000495900023A5F00184A5500216B4A00118635
  0016902D001A7F2F00195124002537290025303600282A360010263300171C2F
  00100A2E0008151D00041C0C001A121D0018050B002E031400340B0700352B08
  00431A1E00841F2500960F0900B40C0100D00B0300D0051B0093142500491A2A\\
  0026172E002B0B4C00570A5A00692280009D3197008435E6007F5AC300836ABB
  0071898900ABAE6900B4933600EAA00D00E88A1800153FB500034CD900035DD0
  00036FC7001C80970036916800359A600034A458003E6F690034555C002A3C50
  001932460009283C000A3949000B4B57001649510022484B001C4E3100176121
  001274110013771300147A16001F7B16002B7C16008E7D1500BB9C1700E9BC19
  00D29F2400BB833000B47D2F00AE782E00C75F5E0093565500AC8D9C00CA9D80"/>
</flame>
```

<flame name="2B2H-Tiling3" size="398 333" center="-0.328524321340426 -1.35398647650595"</p>

And a final one...



```
< flame name="2B2H-Tiling4" size="398 333" center="-0.242810294213264 0.10842170114447" scale="55.67" oversample="1" filter="0.1" quality="50" background="0 0 0" brightness="30" gamma="3" >
```

```
<xform weight="0.5" color="0.571" linear="1" coefs="1 0 0 1 -1 -1" />
<xform weight="0.5" color="0.801" linear="1" coefs="1 0 0 1 1 -1" />
<xform weight="0.5" color="0.447" linear="1" coefs="1 0 0 1 1 1" />
<xform weight="0.5" color="0.366" linear="1" coefs="1 0 0 1 -1 1" />
```

<xform weight="0.5" color="0.276" linear="-0.086" coefs="1 0 0 1 0 0" />

<xform weight="0.5" color="0.216" diamond="0.926" coefs="0.290472 0.167704 -0.167704
0.290472 0 -2" />

<colors count="256"

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</flame>

Use of blur

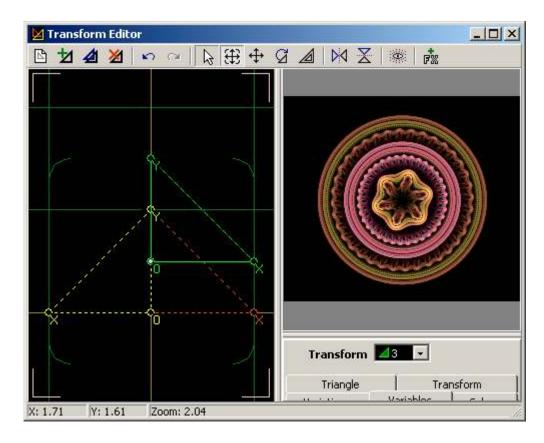
Zueuk, Grinagog and Psion005 have used this variation to create some extraordinary flames. They look solid as though constructed from metal or plastic.

The way I have found a use for blur is to use it in a triangle on its own with no other variations. Lets create an example and fall back to our friend julian.

Step by step.

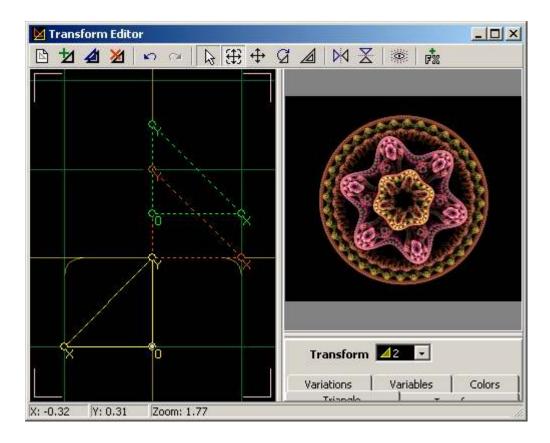
- 1. Create a New Blank Flame
- 2. Remove the linear variation from both and set julian to 1.5 on triangle 1 and 1 on triangle 2. Flip one horizontally if you prefer
- 3. Add another triangle, set linear to 0 and julian to 0.5 and move it up 0.5 units
- 4. Now go to the **variables** tab and make the following changes
 - a) triangle 3: Julian Power = 6, julian dist = 1
 - b) triangle 2: julian power = 4, julian dist = 1.5
 - c) triangle 1: julian Power = 6, julian dist = 1.5

Again depending on gradient, you should get something like this:

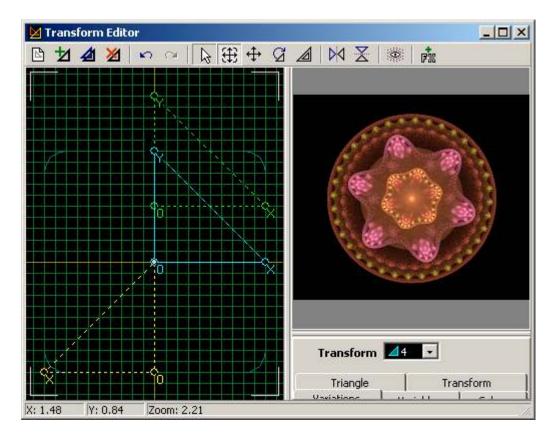


Ok now we need something for our blur to work on.

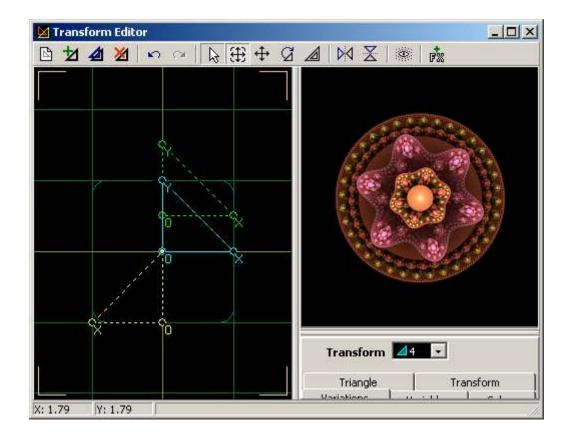
5. Move triangle 2 down 1 unit:



6. Add another triangle, set linear to 0 and blur to 1 (screenshot on next page). Now the image looks fuzzy so we need to reduce the amount of blur to sharpen it.



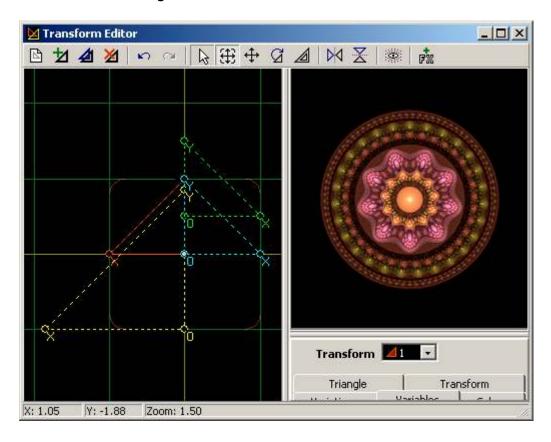
7. Reduce the blur to 0.25. This is what I now get:



Now this is quite cool but I think some improvements can be made. To finish make the following changes:

- 8. Triangle 1: julian power change to 3, julian dist to 0.75
- 9. triangle 2: julian variation change to 0.75, julian power to 9 and julian dist to 2
- 10. triangle 3: julian power to 11, julian distance to 2

This is the final image:



Here is the parameter file:

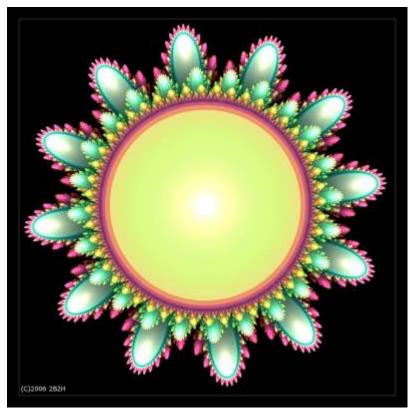
```
<flame name="2B2H Julian + blur" size="319 350" center="-0.00284983071869949 -
0.0206714257266298" scale="69.3554661016949" oversample="1" filter="0.1" quality="10"
background="0 0 0" brightness="5" gamma="3" >
 <xform weight="0.5" color="0" julian="1.514" coefs="-1 0 0 1 0 0" julian power="3"</pre>
julian dist="0.75" />
 <xform weight="0.5" color="1" julian="0.75" coefs="-1.848363 0 0 1.848363 0 1" julian power="9"</p>
julian dist="2"/>
 <xform weight="0.5" color="0" julian="0.5" coefs="1 0 0 1 0 -0.5" julian power="11"</pre>
julian dist="2"/>
 <xform weight="0.5" color="0" blur="0.25" coefs="1 0 0 1 0 0" />
 <colors count="256"
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  00AF708F00BE537400CD375A00CD304500CE2A3000C2262C00B6232900A4312B
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```

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What blur does is fill the 'holes' to give the appearance of spheres and 'solidify' the flame. A few examples using this technique can be seen below and on the next page. 'Wild Thing', one of my more colourful flames was created using this technique, but using the spherical variation instead of Julian:





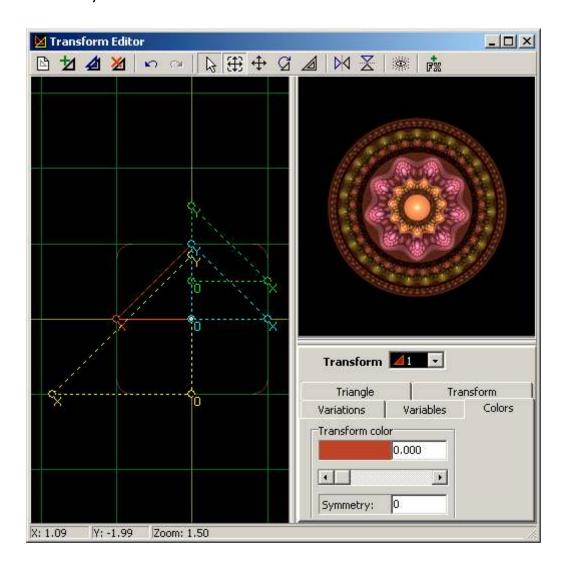


Adding Colour to your flames

There are two ways you can do this. The first is simply to use the **Flame** menu and select **Calculate Color Values**

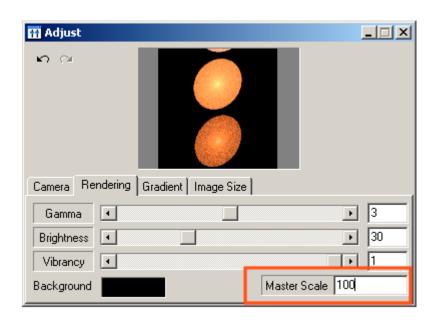
The second method is the one I tend to use now and I will describe this next. Before I do so, if you have had problems colouring flames in previous versions (particularly 2.03c) you should find it much easier in this latest version. The reason is this. When you used AddTransform (either via script or the toolbar) when a transform was added *it also included a symmetry value of 1 by default* (except for the first two transforms when the New Blank Flame button was used) This was only discovered during beta testing of 2.03d and fixed so if you want to go and tweak your old flame colours, check the symmetry values first \odot

Ok onto tweaking colours. Another confession. Up until using this version I was content using the menu option mentioned in the previous paragraph. Now I rarely use it. For this exercise we will use the **Colors** tab in the editor:



This method is very simple but extremely effective. Using the method of changing variables described in **Tip No. 2** back in the section **Working with the Editor**, place the cursor over the section filled with colour and hold the left mouse button down and drag left or right. The value will change in the same way as it does for variations but the important things are you can finely adjust colours very easily **and** see the influence on the flame. This allows you to make very subtle changes which can make all the difference. It's as simple as that. No magic tricks and probably one of the more important things I can teach you about, assuming you weren't already aware ©

Final Tip: Don't use the zoom icon in the main window. It is MUCH faster to use the Master Scale in the Adjust Window:



Conclusion

That about does it. All the flames in my gallery have been created using these methods – even the solid looking ones. For the solid look, I would suggest starting with the julian and experiment using the tips I have given in the julian section. The important thing is that the blur must be used on it's own in one triangle. Once you get the hang of this try using other variations instead of julian with blur. I find this more difficult but I have had some success.

Before I finish I would advocate looking at the galleries of the following Apo artists whom I have a lot of respect for. There are others too but I want to let you have time to create your own flames as well \circledcirc I hope I have managed to expand your creativity just a little as this great little program has addictive qualities once you start to get creative.

Apo Artists

Zueuk (Apo artist and developer): http://zueuk.deviantart.com

Psion005 (Apo artist and 2.03d beta tester): http://psion005.deviantart.com

Grinagog (Apo artist and 2.03d beta tester): http://grinagog.deviantart.com

MichaelFaber (Apo artist): http://michaelfaber.deviantart.com

Lastly, should anyone wish to look at my gallery of Apo artwork, it can be found at:

2B2H (Apo artist and 2.03d beta tester): http://2b2h.deviantart.com

email: carl.skepper@ivy-cottage.net