

SCIENCE FICTION ARTIST IN-DEPTH INTERVIEWS

Digital Art LIVE

SPECIAL ISSUE: 'THE COSMOS'



DAVID A. HARDY



ALI RIES



TOBIAS ROETSCH



**ISSUE FIVE
FEB 2016**

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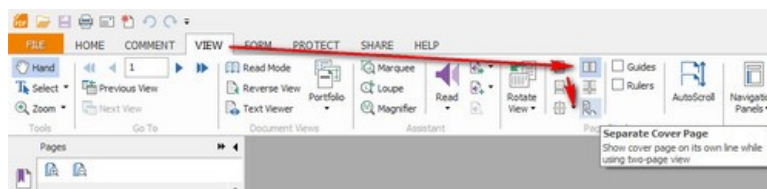
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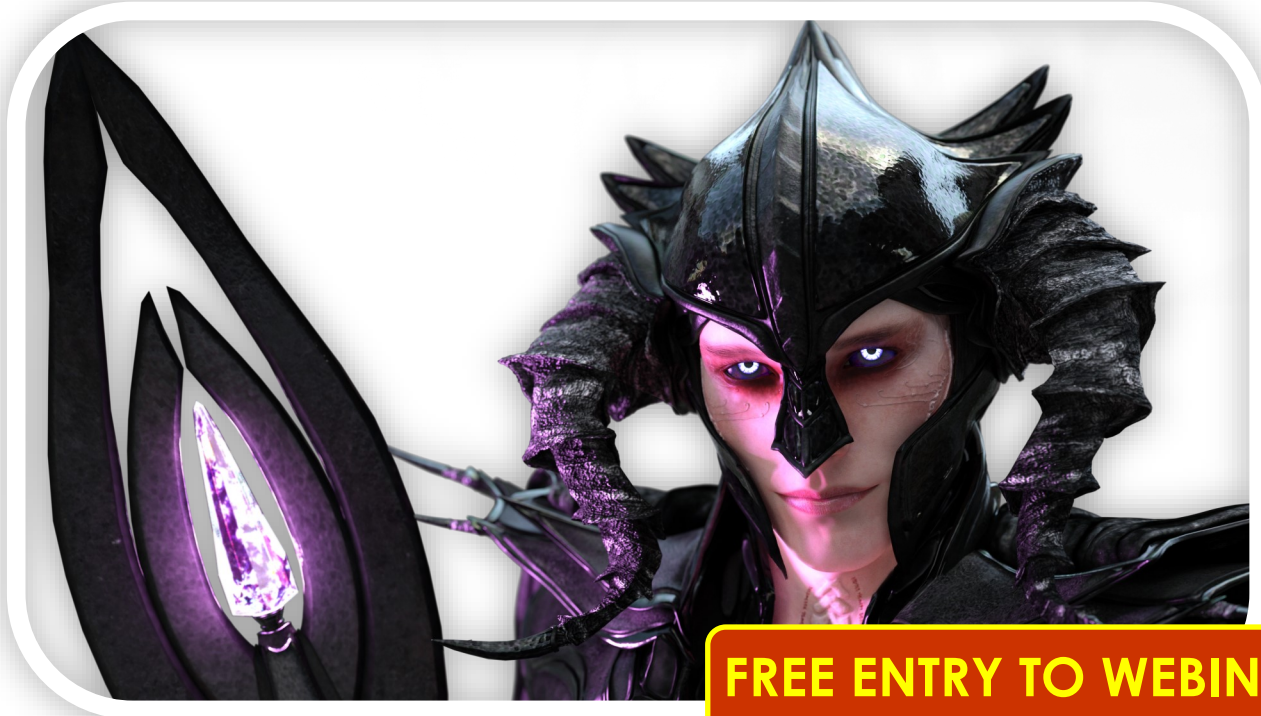
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DAZ Studio Special Arki's World Revealed

Saturday 20th February 2016 20:00 GMT/15:00 EST/12:00 PST

Register at digitalartlive.com



FREE ENTRY TO WEBINAR

- Original design sketches
- Design stages
- Texture tips
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- How to use templates as time savers for creating clothing.
- Sneak peaks of current content development
- Q&A session on Arki's clothing designs
- **Exclusive discount code for Arki's content in the DAZ Store.**

Community Webinar



On **Saturday the 12th of March** we'll be having an exclusive and different type of community event, where you are invited to bring along your some of your own artwork or modelling content and have the opportunity to do the following:-

- Have your artwork or model shown during the webinar to other attendees. Share the story behind your artwork, how was it inspired and if there's a "backstory" to it.
- Ask for assessment on your artwork.
- We'll provide some positive feedback as well as improvement points on aspects such as composition, lighting, materials, figure posing, colour scheme and so forth.
- To complete the process we'll set some actions for you and then follow up at a similar webinar next month.

Bring along as few or as many pieces as you like, but please notify me as to how many you'll be sharing. You'll need to submit it to our dropbox (see [event page](#) for link) as well. This will help me plan and time the event. Since we're talking about resulting artwork or models, it doesn't matter how you've created it digitally – you are very welcome to attend.

Be aware that generally we have a focus on sci-fi and fantasy genres, but I'm open to other types of artwork for this session.

Depending on time left over, there'll be a presentation on some amazing artwork pieces we've published in 3D Art Direct and Digital Art Live and I'll talk about the best aspects of each of these artworks, but also comment on some potential improvements for each piece.

BONUS!

If you have your work showcased in the webinar, we'll consider your work to be promoted in the Digital Art Live magazine, in a gallery or in an article.

(from all our publications we've had 1,699,705 impressions so far on our on-line publishing platform)

<https://digitalartlive.com/events/>

Ten Hands-on Photorealistic Effects Using **Reality**

for Poser and DAZ Studio

Saturday 27th February 2016 20:00 GMT/15:00 EST/12:00 PST

Register at digitalartLive.com



Learn how to create photo-realistic effects the easy and fun way.

- Achieve photo-realism faster and with less effort by using Reality, the ground-breaking plugin that has brought Physics-based rendering to DAZ Studio and Poser.

Frustrated by the Poser Material Room? Bewildered by the Studio never-ending list of parameters? **Stop struggling and start enjoying your art now.** This class will show how to get your own vision on screen more easily.

Paolo Ciccone, author of Reality plugin will show you **ten ways of creating photo-realistic materials** with just few clicks of the mouse.

FREE ENTRY TO WEBINAR

SCULPT OF THRONES



Fan art is an incredibly useful tool for channelling inspiration and motivation into a real project that can get your work **noticed**. After all, the most useful inspiration is that which is acted upon, rather than left in the back of our minds.

Creating fan art can generate understanding of design and techniques during the process, which may not have otherwise been learned.

In this 1.5 hour webinar session, **John Haverkamp** provided live sculpting of the character Tywin Lannister from the HBO TV Game of Thrones!

From this recorded session you'll learn:-

- The importance of strong proportional and anatomy knowledge so the photo reference doesn't mislead.
- "Reading" the reference correctly to get essential particulars of the features; starting from broad to narrow.
- Using a reference to inform details like wrinkles and skin pores.
- The sculpt technique with the paintover process
- Adding and Subtracting: standard brush, clay build-up brush and dam standard brush.
- Smoothing and trimming: smooth brush, trim dynamic brush and trim curve brush
- Use of the move brush, move topological brush and snake hook brush.

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Front Cover: "Moon to Mars" (2000) by David A. Hardy.

OUR SPECIAL "COSMOS" ISSUE

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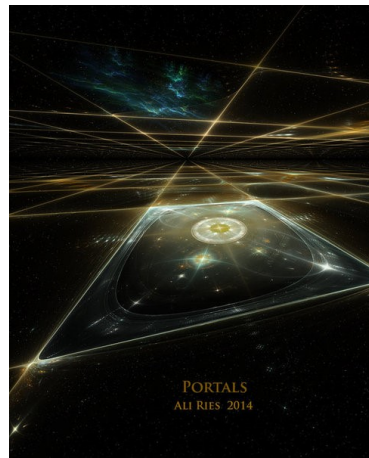
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DAVID A. HARDY

Digital Art LIVE interviews the world's longest-established living space artist in the West, first published in 1952.

PAINTING | PHOTOSHOP

"Next thing I knew I had been asked to illustrate Patrick Moore's book *Suns, Myths and Men*. ... The only problem was I then had five days to produce the illustrations before joining the RAF."



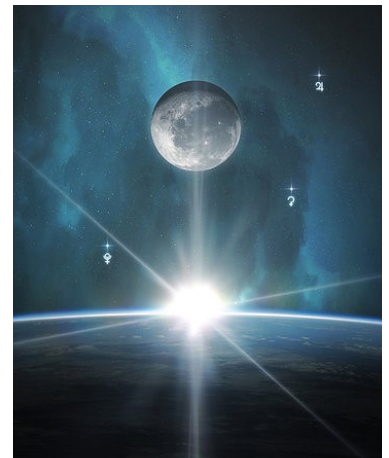
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ALI RIES

Digital Art LIVE interviews a specialist in nebulae and cosmic art. Her work is used for *Star Trek* and in big sci-fi movies and TV.

APOPHYSIS | PHOTOSHOP

"I would love to see my artwork as a mural or on a big canvas. So far I have seen them 3' x 2' feet, but I think they could be *a lot* larger without losing impact."



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TOBIAS ROETSCH

Digital Art LIVE interviews Tobias about the production and printing of his new calendar of the Solar System.

BLENDER | PHOTOSHOP

"... personal projects and images ... usually lead to good publicity and new commissions. So therefore making my own work is an important part of the entire business."



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LIVE

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Credits for backgrounds, from top left: Tobias Roetsch; Ali Reis; and David A. Hardy.



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EDITOR'S LETTER

WELCOME...

Carl Sagan who presented the original Cosmos TV series reminded us of the grandeur and scale of the universe in which we live: "Lost somewhere between immensity and eternity is our tiny planetary home, the Earth," he said and also "this cosmos, in which we float like a mote of dust in the morning sky."

Carl had trust in the general public to accept his vision and "personal voyage" and the science that was conveyed in the series saying "the public is far more intelligent than it has generally been given credit for; that the deepest scientific questions about the nature and origin of the world excite the interests and passions of an enormous number of people."

His trust and confidence in this paid off. From the year it was first broadcast the number of viewers represented something like three percent of the population of planet Earth. Since that time it Cosmos been one of the most widely watched series in the history of American public television.

So this issue is dedicated to the impact of that series and no doubt many of the space artists we have featured to date have gained some of their inspiration from the ground breaking special effects and memorable

artwork used in the Cosmos series. The follow on series Cosmos "A Spacetime Odyssey" continues to provide impact and help popularise science.

Space art helps us consider the scale and the wonder of the universe. It allows us to dream and construct worlds of fiction, but at the same time helps motivate others to find them using the increasing amount of methods to detect and measure planetary bodies billions of miles away.

This week it was announced that gravity waves were detected. Gravity waves can answer questions about the very moment of creation. Astronomers look back in time as well as space. But to look 13 billion light years away at the beginning of the universe, no telescope could detect that light, no matter how perfect. But gravity waves must have been there, right from the beginning—and so there may be a chance to detect these.

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Digital Art LIVE interviews David A. Hardy. David is the world's longest-established living space artist in the West, having been first published in 1952.

DAVID A. HARDY

Picture:
"Phoenix" (detail),
used in *Astronomy
Now* in Sept 2003.
So named because
of its likeness to
the mythical bird,
and that fact that
the Voyager
spacecraft will
never really die.

For this special 'Cosmos' issue of our magazine, we're very pleased to interview David A. Hardy, FBIS, FIAAA. David is the longest-established living space artist in the West, having been first published in 1952. He is currently the Vice President for Europe of the International Association of Astronomical Artists (IAAA), and he recently received the Ordway Award from the American Astronautical Association (AAS).

DAL: David, welcome, and thanks very much for giving us this in-depth interview.

DAH: No problem. Don't forget that I'm 'retired' now, so I have lots of time on my hands. Yeah, *right!* How does an artist retire?

DAL: Indeed. Well now, where to begin in with a career in space art starting way back in 1952? Let's start with a point in time common to both of us. For a couple of years I was your callow and pimply young assistant in



DAVID HARDY

UK

FINE ARTIST |
ILLUSTRATOR | SF
AUTHOR

[WEB](#)

the Art Room at Novacon, the venerable British SF convention, way back in the early 1980s. Not sure I did a great job there, but at least I helped put the pictures up straight and carried them to the art auction without dropping the boxes.

DAH: Oh, it's always good to have willing helpers.

DAL: So, let's reminisce about the city of Birmingham in which you came of age. A *very* different place than today, a much rougher and probably far more vibrant city centre than the rather dull shop-a-rama that we have today. I remember it in my post-punk 80s youth. But you were of a generation or so before me — the 1950s and the 1960s — the heroic years of *Dan Dare* through the letterbox each week, the early Space Race. What are your *very* early memories of how you became aware of space as a boy, and then how did your interest develop?

DAH: In 1950 I was given a book called *Flights into the Future* for Christmas. It featured what I now know to be the British Interplanetary Society's 1939 design for a Moonship, articles by Professor A. M. Low, and so on. I was hooked! I was just a little old, or so I felt, for *The Eagle*. Though I borrowed my younger friend's copy each week for the *Dan Dare* comic strip. I later met Frank Hampson, the *Dan Dare* creator, who said complimentary things about my own work.

DAL: Do you also remember the strange proto-electronica sounds of the BBC's Radiophonic Workshop on the radio and *Doctor Who*?

DAH: Yes, I got a tape recorder in 1957, and did indeed try my own attempts at *musique concrete*. I made an echo chamber, since I was — and still am — a big fan of rock 'n' roll. Buddy Holly would be the same age as me now, had he lived!

Then in 1951 I had Arthur C. Clarke's *Interplanetary Flight*, and a year later his *Exploration of Space*. But it was *The Conquest of Space* by Willy Ley, with amazingly photographic illustrations by Chesley Bonestell (1950) which really inspired me to become a

space artist. Of course, his jagged lunar mountains, so unlike the eventual Apollo mission photos, became the 'model' for lunar landscapes — whether on SF covers or space art, for years to come.

DAL: You started off with acrylic and oil paints, and the airbrush. Where did you train as an artist? Or were you self-taught?

DAH: I never really 'trained' — I was self-taught. When I left grammar school in 1952 I was advised that there was no future as an artist, and as I was equally good at science I took a job in a laboratory at the age of 16. But at 18 I had to do National Service in the military. So, of course, I applied for the Royal Air Force (R.A.F.), and succeeded. However, because I had been working in a pharmaceutical lab they put me in the Medical Branch — not my own first choice, but I made the most of it and quite enjoyed it on the whole. I became an SAC — a Senior Aircraftman.

DAL: And then you worked on a series of paintings for your first book — *Suns, Myths and Men* — for the late astronomer and broadcaster Patrick Moore, who was later a very well-known science personality in the UK. He was also an admirably vigorous sceptic and debunker of pseudoscience. So you started working with him in... 1954? A time when — if I remember my history right — there was still paper-rationing just after the Second World War! So, what's the story of how a boy of 18 in the RAF got to work with Patrick Moore on a book?

DAH: In 1952 I had joined the British Interplanetary Society, and found that there was a Midlands Branch meeting in Birmingham each month. A friend I met there, Michael Guest — sadly he too died last year — had built his own telescope and had thus been invited to go down to see Patrick Moore's telescope in Suffolk. Michael asked if I'd like him to take some of my work to show Patrick, and of course I jumped at the chance.

DAL: Wow, what a great chance.

DAH: Next thing I knew I had been asked to illustrate Patrick's book *Suns, Myths and Men*.

The Boys' Book of ASTRONOMY

The Boys' Book of ASTRONOMY


Picture: David A. Hardy cover for one of the first popular books (1959) by Sir Patrick Moore, who was the British equivalent of Carl Sagan.

PATRICK MOORE

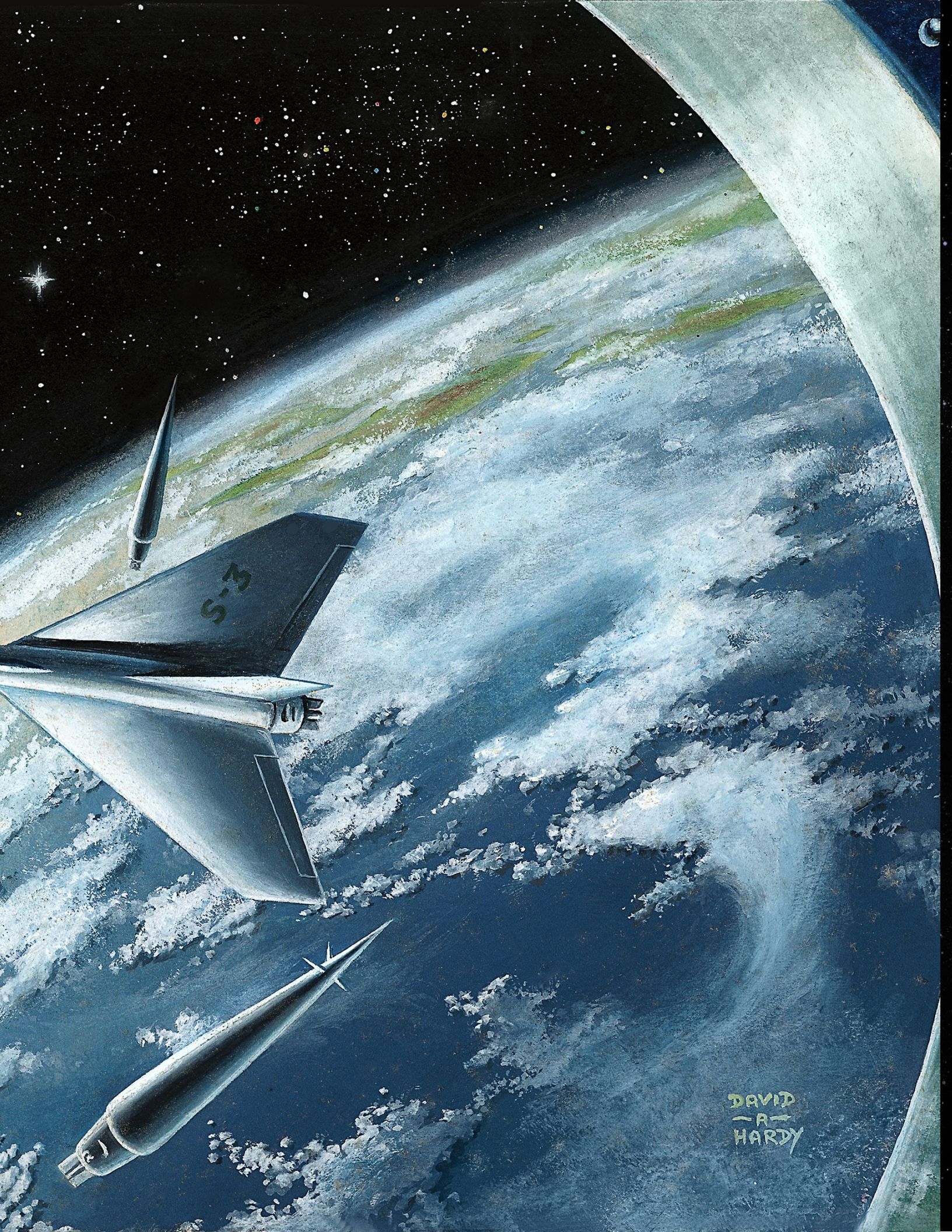
Fellow of the Royal Astronomical Society

BURKE

HARDY



Picture: "Ferry Rocket and Space Station", 1950s. The wheel-shaped space station was designed by Werner von Braun, and the dual-pod deep-space craft was designed by Arthur C. Clarke — and would later become the famous craft depicted in the movie of *2001: a Space Odyssey*.



DAVID
-A-
HARDY

The only problem was that I then had five days to produce eight black-and-white illustrations before joining the RAF... But I did it – and that’s been the story of my life ever since really! I continued painting while in the RAF, for the a book that would become *Challenge of the Stars*.

DAL: And then you worked on Patrick Moore's *The Sky at Night* TV show, from 1957 — and right up until British TV had a collectively outbreak of terminal naff-ness — sometime around the mid 1990s.

DAH: I produced illustrations for *The Sky at Night* from 1957 right through really.

DAL: And how were the 1960s in Birmingham, for you? Swinging?

DAH: Well I worked at Cadbury’s, then left to go freelance in 1965. I then lived in a caravan for a couple of years to get rid of the mortgage millstone. I moved to Norfolk between 1967 and 1973, then I came back to Brum.

As a result of my first major exhibition, at the London Planetarium in 1968, I had produced a set of 36 x 35mm slides. I advertised these, under the trade name AstroArt (©), still used, not only in astronomical magazines but also the *New Musical Express* and similar papers. These were then used in the then-popular ‘light shows’, not only of the Moody Blues and Hawkwind but also of Pink Floyd and Camel.

DAL: And the science fiction band Hawkwind were big fans of your work?

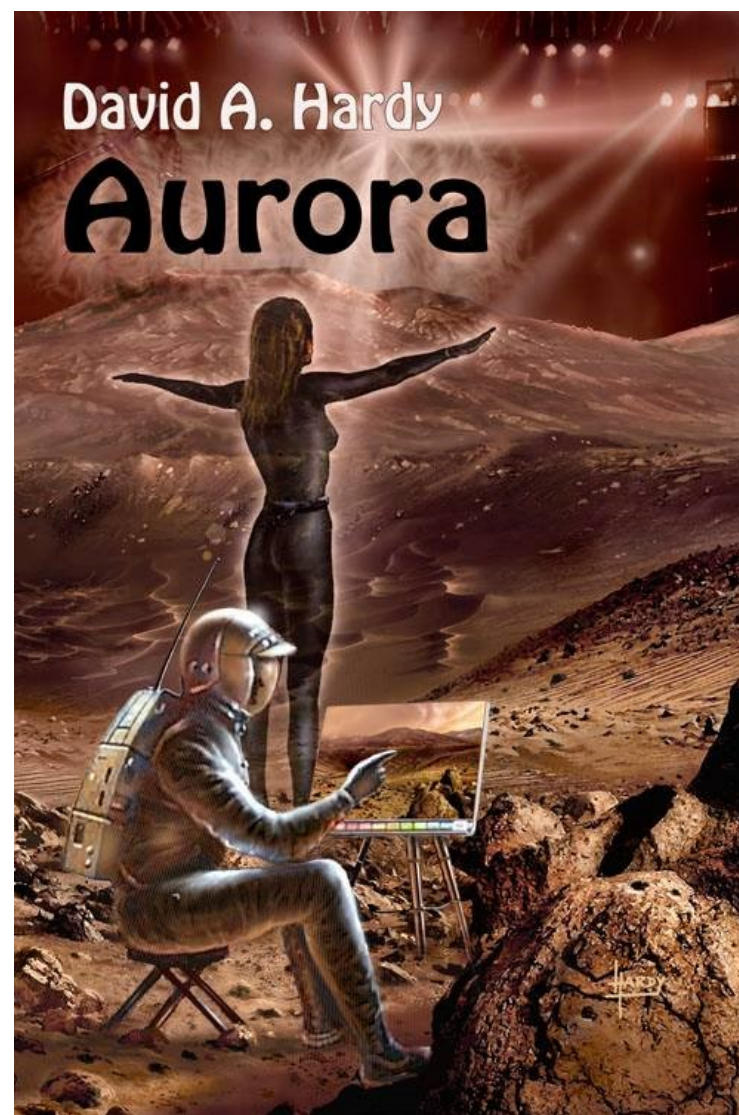
DAH: I think my neighbours were a *bit* surprised one day in 1976, when a minibus drove up outside and the whole of the band Hawkwind piled out! Lemmy — the late much-lamented Lemmy — was wearing a pair of jeans so threadbare and full of holes that my wife Ruth looked him up and down, said: “Stand there a minute”, and went and fetched a needle and thread. He stood there like a lamb as she stitched up the worst of the holes so that they wouldn’t actually fall apart.

I was lucky to meet several bands in the 1970s, partly as a result of meeting the late ‘Big’ Jim Sullivan, then a leading session guitarist, in

1970. He introduced me to — also now late — Tony Clarke, producer of the Moody Blues. I went with Tony and drummer Graeme Edge to see the launch of Apollo 15 in 1971. Afterwards Tony commented rather grumpily: “If I’d been in the control booth I’d have boosted the bass!”

But, like they say about the 60s, “if you remember them you weren’t there.”

So I came back to Birmingham in 1973 to find that I had *just* missed the opening of the Birmingham Science Fiction Group; but I quickly became its Publicity Officer, and later moved on to Secretary, Newsletter Editor — I dragged the ‘*Brum Group News*’, as I renamed it, kicking and screaming into the digital age, via my Atari ST — and Chairman.



David A. Hardy is also a science fiction novelist. His novel *Aurora: A Child of Two Worlds* is available for the Kindle and in print from Wildside Press.

But yes, I think the city was a much more interesting place back then, with more individuality. In the 1970s Rog Peyton's Andromeda Bookshop was emerging in Birmingham and would become the biggest SF bookshop in the UK, possibly in the world. Andromeda was always a focal point for me, and I made a video of the opening of the huge new one, attended by just about everyone who WAS anyone in SF — including of course many who are sadly no longer with us. Rob Holdstock, Terry Pratchett, and Iain M. Banks who opened it... too many to mention.

DAL: Yes, I spent quite a bit in there, though I seem to remember that Rog's prices were distinctly cheaper in the old shop. His price hike may even have partly contributed to my moving away from literary science fiction — having read all of it to that point — to politics in circa 1985. So, how did you navigate that difficult time of the 1970s, as an artist? You've mentioned selling the 35mm slides for rock gigs and lightshows. But was it possible then to balance space art with science fiction art, or was there a transition point — as the space race ended and the modern science fiction industry began to grow and blossom from about 1976?

DAH: Well, as I said I had been illustrating books for and with the well-known astronomer Patrick Moore since 1954. But then in 1972 we published our major work *Challenge of the Stars*. That had been on the back-burner before, since we couldn't find a publisher who would touch it during the 1950s and 60s. But — and it's a big 'but' — it was in that year, 1972, that men went to the Moon for the *last time*. The enthusiasm for the space race, that had made Patrick's *Moon Flight Atlas* a huge best-seller just a few years earlier, had died. So it was no coincidence, really, that it was in 1970 that I did my first covers for *Vision of Tomorrow*, and shortly afterwards for the major U.S. *Magazine of Fantasy & Science Fiction* (F&SF). Indeed, I was soon doing more SF than space art.

DAL: I see. And I should probably remind younger readers that that was still very much



David A. Hardy is the Vice President of the International Association of Astronomical Artists (IAAA). The IAAA was established in 1981 as a group of independent astronomical artists, and soon became part of a global network of space artists. Since then the IAAA has held a string of artist workshops around the world, working with leading players such as NASA and numerous major museums and galleries. The IAAA's workshops have included locations such as: the blast-zone of the active volcano Mount St. Helen's; the geysers of Yellowstone in America; England's Stonehenge at sunset; Death Valley in California; the volcanoes and jungles of Nicaragua; and the Badlands of Utah.

<http://iaaa.org/>

Picture: David A. Hardy with the BBC *Sky at Night* presenter Patrick Moore. Hardy worked for Moore for many decades.

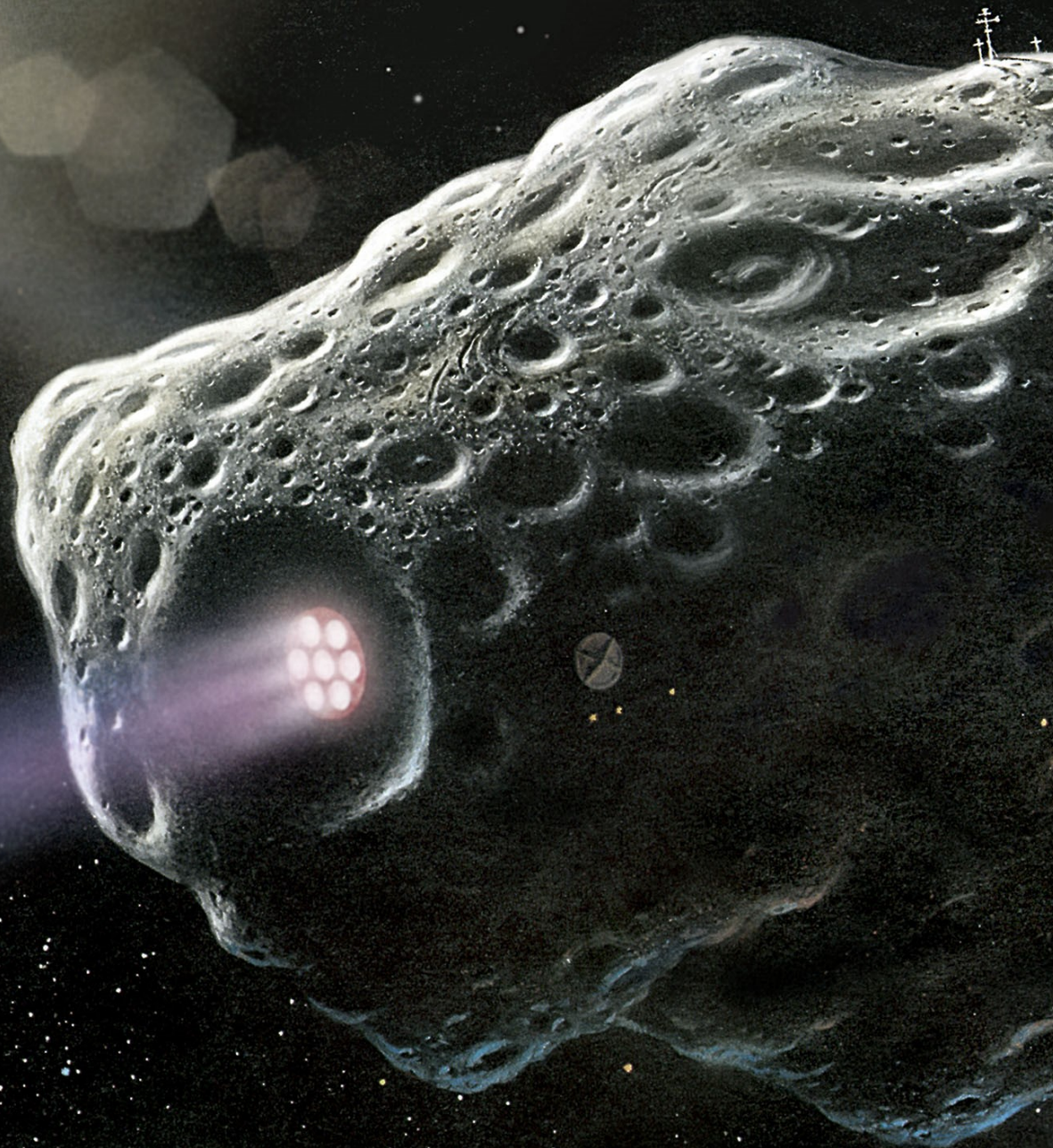


the pre-Internet era. Paperback books, magazines, fanzines mostly run off on hand-cranked stencil duplicators. So there were a lot of gatekeepers and editors to please, very limited space, and also a very high 'quality barrier'.

DAH: But I found a way to combine SF with

space art, via *F&SF*, by inventing the alien 'Bhen' the BENEvolent BEM, who adorned its cover in 1975, when Viking was on its way to Mars. There followed a total of 12 covers featuring Bhen, the latest being November/December 2015 – his '40th anniversary'! Most of these showed him making unorthodox use of NASA hardware: my way of still using space art,

Picture: "Asteroid Ark", 1978. The Ark would be a generational starship, formed from a hollowed out asteroid of suitable size and composition. The inert rock or rock-metal crust would provide the inhabitants with natural shielding from impacts, radiation and the cold of deep space.



but in a humorous context.

DAL: And your work was also a part of the much-loved British TV science weekly *Tomorrow's World*, the weekly science documentary *Horizon* and more. Sagan's *Cosmos*, too, in America. I'm sure readers would be interested in your memories of those pioneering days of British

science TV, and perhaps especially in your role in the making of *Cosmos*?

DAH: It's not as exciting as it may sound actually! Usually just a case of being asked to do a painting or paintings, and then trusting them to the tender mercies of the Post Office.

Later I got a large-format camera and made



Picture: "Portals to Infinity", 2011. An expanded recreation of a *Galactic Tours* picture from 1981.





transparencies to send; but today's digital methods, JPGs and email make the whole process so much easier.

DAL: Did you ever get to meet Carl Sagan?

DAH: I did get to meet Carl Sagan several times, both in London and in Pasadena in America, home of The Planetary Society. He used my work a number of times, and bought several originals, including the first 'Bhen' one. He was a keen supporter of space art, and used a number of artists on *Cosmos*, and also in *Planetary Report* and others he was involved with. He was in a way 'the Patrick Moore of the USA', inasmuch as he did a huge amount to inform and educate the public about space and astronomy. So tragic that he had to die so young. In person he was very approachable, friendly, and of course intelligent in conversation, and an inspirational lecturer. Sadly I never had a photo of myself with him.

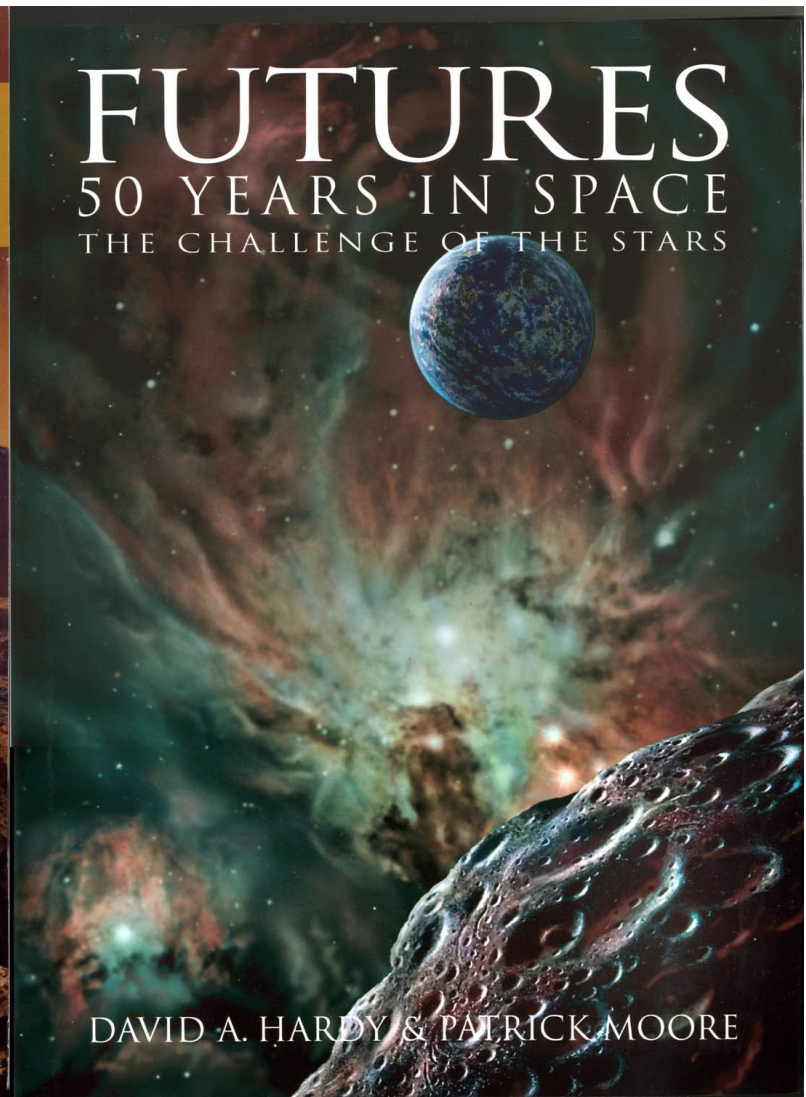
In 1994 he also asked to use my painting of a terraformed Mars, for the cover of his book *A*

Pale Blue Dot. The problem here was that Arthur C. Clarke had already asked to use it for his own *The Snows of Olympus*. I solved that by suggesting that Carl use a later version, in which the northern hemisphere of Mars is covered by the Oceanus Borealis or Northern Ocean, which he did.

DAL: Did you ever meet Arthur C. Clarke, or was he mostly living over in Ceylon by then?

DAH: Oh yes, I met Arthur several times. The first being in 1952, because he gave a talk to the British Interplanetary Society at my college where I was then working. I was also invited to his 75th birthday party in the English seaside resort Minehead, where I gave a talk. I also got to meet R.A. (Ralph) Smith, who was Arthur's artist for those books. He was an engineer, so designed his own spacecraft etc. for the British Interplanetary Society.

DAL: What was your favourite science fiction, from the golden years —1935-1985?



DAH: That's a hard one — there was *so* much! Naturally I always preferred 'hard' scientifically accurate SF, and especially that concerned with space. So Clarke, Asimov, Clement, Niven, Bova, Sheffield, Benford, Brin. Later Steele, Robinson, Baxter, Reynolds . . . stop! I did get to work with many of them though, either for books or covers for magazines like *F&SF* and *Analog*.

DAL: Let's talk about the start of the digital revolution in art. You dived into that early. Your first computer was in 1986, I hear, an Atari ST with 512K of RAM? Was it any good for making art?

DAH: Yes, it was an Atari 520 ST with 512k of RAM. I went on to get a 1040 and then a state-of-the art Falcon. I couldn't really do anything useful for publishing on my Atari machines. But I did produce the backgrounds for an award-winning videogame, *Kristal*, produced by a company with the lovely name of Fission Chip Software. My first Mac, in 1991, had 512Mb of RAM, and I currently use an iMac with 8Gb of RAM and several TB of storage.

DAL: And you met the International Association of Astronomical Artists, in 1988. Was that part of the research for your seminal book *Visions of Space* (1989) which collected and surveyed all space art up to that time?

DAH: I had joined the IAAA in 1986, and when they held a workshop in Iceland, also attended by a dozen Russian (then Soviet) artists including the cosmonaut Alexei Leonov. I signed up for it, and wrote a report of the workshop for *New Scientist*. The report was seen by Hubert Schaafsma of Dragon's World/Paper Tiger illustrated books.

DAL: Ah yes, I remember encountering their books in the used bookshops of the early 1980s. They were a major name at the time, and spread the good word about many imaginative artists. Quite innovative, large format paperbacks and they did very well in the market judging by the number of second-hand copies.

DAH: He said he had long wanted to do a book about space art, and would I be interested in

writing one? Would I! I wrote it, contacted all 72 artists. All by letter, or occasionally fax, as this was pre-digital. I compiled, edited and designed it, and *Visions of Space* was published in 1989.

DAL: Did you ever meet the the American space artist Chesley Bonestell?

DAH: I never actually met Chesley, but we did correspond via letters in the 1960s. He was born in 1888 and died in 1986, so lived to see most of his visions become reality. Except for men on Mars, or any other world except the Moon, of course.

DAL: And how did your own work develop after 1990? Was there a divergence, an expansion?

DAH: The change was of course to working digitally. I have always embraced new technology and working methods; for instance in the 1980s I was well 'into' photography and had my own darkroom. It was tiny — the cloakroom under the stairs! — but I used it for manipulation of negatives and prints, first in monochrome then in colour.

I even became an Associate of the Royal Photographic Society (ARPS). But computers meant that I could do all that, and more, in daylight and normal temperatures. Rather than in the dark or under a red light at *exactly* 18 degrees Celsius.

DAL: Then you worked on the major book *Futures: 50 Years in Space*, with Sir Patrick Moore, which went into a paperback edition in 2006. It won the Sir Arthur Clarke Award in 2005, and was nominated for a Hugo award, which is the SF version of the Oscars. That must have been a good feeling.

DAH: I wasn't the editor, but I co-wrote it and wrote all the captions, as well as doing all the illustrations, of course — many of them digitally, and some using a new terrain generator called Terragen. As well as the usual Photoshop. Patrick and I had always said that we wanted to do a sequel to the 1972 book *Challenge of the Stars*, bringing it up to date.

So our 50th anniversary was an ideal



HARDY

Pictures: "Milky Way 1" (this page); and
"Alien Life in the Globular Cluster" (opposite).



HARDY

opportunity. A revised, paperback edition was published in 2006, simply titled *50 Years in Space: What We Thought Then... What We Know Now*. In the 1950s we used to think we'd go on, after building a station in orbit to landing on the Moon. Then build bases there, then on to manned missions to Mars, and so on. But instead, thanks to miniaturisation we have of course sent unmanned probes and satellites to the planets and their moons, put the Hubble Space Telescope (HST) in orbit, and achieved an enormous amount without humans going in person.

DAL: Amazing discoveries.

DAH: Yes, just in our own Solar System we've found volcanoes on Mars, Venus and Io (the latter very active). Cryovolcanism and geysers on Triton, Enceladus and possibly on Titan and Pluto, sub-ice oceans on Europa and Enceladus, and *every* world has proved to be more interesting and exciting than we ever imagined.

DAL: So true, and now we have the sterling mystery of why Pluto has such a young surface. What topics or aspects of space need to be painted well in space art, but haven't yet been?

DAH: Only those that we haven't yet discovered, I suspect!

DAL: So what are your personal favourite paintings, among your pictures, and why?

DAH: Very difficult question. I'm tempted to say: "The latest". One is certainly "Portals to Infinity" (seen below) which was a private commission. But it has been used as a cover on Anne Nicholls' *Music from the Fifth Planet* (Alchemy Press, 2015). I'm also rather pleased with my actual latest traditional painting, 'Two Worlds', in which I compare the surface of our planet with that of its satellite, in a rather interesting way I think.

DAL: What changes have you seen in illustration as a business?

DAH: Going back to my days at Cadbury's, while waiting for a vacancy in the Studio (advertising) or Design Office (packaging, catalogues, etc. — this is where I ended up) I was put to work in

the General Sales Office. There I learnt a lot about producing and sending invoices and statements, keeping accounts, etc., which proved useful when I became a freelance. What I would say is that prices and fees have not increased anything like as much as one would expect since this period.

DAL: And today?

DAH: Today self-publishing and print-on-demand mean that publishers no longer have budgets of thousands of pounds to spend on art. Many seem to expect to get it for next to nothing, as if artists just do this as a hobby, rather than making their living at it. So I'm quite often offered a fee that's no better than it would have been in 1970. If I turn it down there is always some young (or not so young) artist who is ready to take it. But then again, there has also been a trend for 'design' covers — those using only typography, photography or abstract shapes — and that also puts the illustrator out of work.

DAL: Specifically, how would you say that the rise of the mass-market broadband Internet and fast PCs with good monitors, after 2005, has impacted on the quality and range of space art?

DAH: Badly! The worst aspect is the spread of 'public domain' images, and everyone and his dog seems to think that any art they see online is there for the taking. It isn't! The same copyright laws apply as for any form of publishing, and images may only be used by the express permission of the artist, and then with a credit and a link to any website etc.

Then there is the fact that there are many quite inexpensive programs that enable just about anyone to produce what look to the layman to be quite acceptable landscapes of other worlds. These, and stock photo libraries, are almost literally killing off artists and especially illustrators — who need to feed their families through their art.

DAL: So would you recommend that an aspiring space artist look to other outlets. Perhaps making videogames rather than canvases?



Picture: "Moon to Mars", 2000.

HARDY

Or other forms of animation and multimedia work?

DAH: Quite possibly. I have never really taken to 3D art (Terragen 1 and Poser being notable exceptions), as they seem to require a mathematician rather than an artist. I can push pixels around instead of paint, using Photoshop, but that's about it. I also feel that a lot of 3D art is 'anonymous'; it is almost impossible to tell who has done it, just by looking at it. I have been told that my digital work still looks like a 'Hardy', which pleases me! But it also means, I think, that there's a growing number of people who reject digital work as 'Art', with a capital 'A', and therefore there is still a market for artists who can *paint*, so that buyers can put that work on their walls. I certainly still enjoy painting a large canvas, which makes a pleasant change from a 27" Mac monitor.

DAL: And now we're plunging fast into the outer rim of a new public interest in — and even optimism about — our future in space. SpaceX; Google's challenge race back to the Moon; the ongoing exploration of solar system and landing on a speeding comet; amazing photos pouring in from orbiting telescopes; the modest revival in flagging spirits at NASA, and more importantly in their publicity team; rovers on Mars and perhaps a manned mission to Mars in the next 20 years; other nations such as India and China in space. What are your hopes for the future, in that regard?

DAH: There has indeed been a renewed interest in space, in the last year or so. Partly as a result of the images from Rosetta, New Horizons, etc., which is good. And there is also a buzz, in the UK at least, around Tim Peake's mission on the ISS. So I am hoping — and preferably within my lifetime! — that we shall see manned landings on the Moon, and even manned missions to Mars. I would prefer it to be by the western world, of course, but as long as it is shared I'm happy for the Russians or Chinese to do it. As long as it *is* done... I would much prefer to see international expeditions,

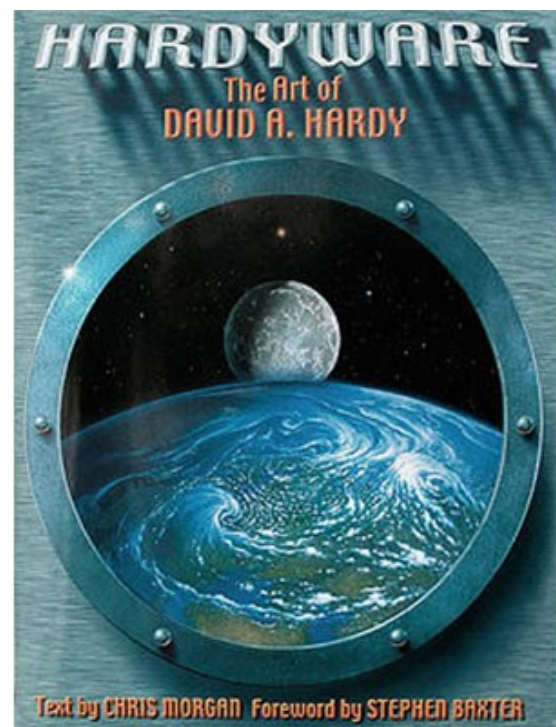
and indeed personally I think this is the only way to go. Cost being only one factor. I was Thomas Cook's consultant for space tourism in the 1980s, following my book with Bob Shaw, *Galactic Tours*. So I am also hoping — as I have been for many years — that putting 'ordinary people' in space will help to kick off a new era of manned space travel and exploration. As will moving industry into space, and exploiting the minerals in asteroids, rather than continuing to desecrate and pollute our own planet.

DAL: David Hardy, thanks very much for this in-depth interview, and we wish you all the best with your art in the future.

DAH: Thank you. Watch this space!

David A. Hardy is online at: www.astroart.org. He is also on Facebook, Twitter and LinkedIn.

In 2001 Paper Tiger published *Hardyware: The Art of David A. Hardy*, an art book about his life and work from the beginning, with text by writer Chris Morgan.





HARDY

Picture: "Pluto and Charon".



Picture: David A. Hardy, "Time and Space", 2013.



HARDY
'13

ALI RIES

Digital Art LIVE interviews Ali Ries, a specialist in nebulae and cosmic art. Her work graces definitive *Star Trek* map-sets, *Star Trek* book covers, and is used as mattes for big sci-fi movies such as the new *Riddick* movie.

DAL: Ali, welcome back. We last talked with you way back in issue 18 of the old *3D Art Direct* magazine, summer 2012. For this new 'Cosmos' themed issue for *Digital Art LIVE*, we thought it would be perfect to have you back to talk about your space art.

AR: Hi, thank you for having me back.

DAL: So, you came of age in the era of the first series TV broadcasts of *Star Trek*, and the run-up to the Apollo missions. Were those the key triggers and influences on your interest in space, or were there other influences around for you at that time?

AR: *Star Trek* started when I was age 12, and it was a major influence in my wanting to do Space Art. Of course all of the NASA missions were just icing on the cake. Great science fiction movies like *2001: A Space Odyssey* and others just fuelled the fire.

DAL: And I understand you were living near the launch sites in Florida? Did you experience any of those classic NASA launches, up close?

AR: Unfortunately I lived in Tampa in Florida, and so I only saw them from afar, as small streaks in the sky. I wish I had been able to see them launch up close.

DAL: Like many of us, you started out with the then-available 3D software. But then you added something called Diardsoftware's 'Universe' to your tool box. I have to admit that's not a software I've ever heard of. Could you tell our readers what that is, and what place it has in your tool kit?

PORTALS

ALI RIES 2014



ALI RIES

USA

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AR: At the time, 1998 and early 2000's I did not have Adobe Photoshop, nor tutorials for making star backgrounds, planets or nebulae. So Universe is a small program that allowed me to put the stars in my "universe", plus planets and smaller nebulae. At the time I had not figured out how to make my nebulae, like I do today.

I do still use Universe today, though, to add the starry backgrounds — because they are so much better than I can do. Plus it allows one to place stars, in a variety of colours, *exactly* where you want them instead of randomly.

DAL: And then you added fractal software to the mix?

AR: Yes! Fractals are the basis of all of my nebulae. I use Apophysis, which is a free program. This does not mean that you can get Apophysis and *presto!* — "push a button and out comes a nebula"...

/laughter/ It is a *bit* more complicated than that. Through experimentation I found a particular set of variables and scripts that allow me to be able to make the nebular fractals that I use in my artwork.

DAL: Your DeviantArt galleries show a clear and steady progression from the mid-late 2000s. You started out making the sort of fun pictures that many emerging digital artists make — and now you're providing mattes to major movies such as the *Riddick* movie series, promotional material for major Kickstart campaigns, and as backdrops your work forms a substantial part of covers for *Star Trek* books and *Star Trek* maps. And you were part of the team that was Emmy-nominated for visual effects on *Battlestar Galactica: Blood and Chrome*.

You must be pleased that the years of perseverance, in working on your art, have paid off.

AR: I am very pleased and honoured to have been part of the teams that created these wonderful movies and books. My 'mentor' Doug Drexler has been the most

helpful in giving me my direction in this field and helping me hone my art. Many others have been wonderful and supportive throughout.

DAL: Did you ever study as a colourist, in some way? Or were you self taught in colour and composition?

AR: I have always had an "eye" for colour, lighting and composition. I did take some classes in photography and design which helped a lot, but mostly I was self taught.

DAL: I sense a possible fantasy videogames influence on some of your early work. *Myst*, the *Elder Scrolls* series, perhaps? Am I wrong on that, or are you also a gamer?

AR: I have never played videogames, and while I have heard of these games, I have not looked at them and rarely look at YouTube to see gameplay videos. I have had many people comment that I should be contributing to the making of videogames, or they have asked if I had contributed to those videogames you mentioned.

DAL: I'm a fan of fine maps, which is not something we seem to get a lot of in space sci-fi. We get the maps, but they often lack a certain something. Fantasy fans seem to have the most luck in that regard. But I see that you've helped make several fine sci-fi maps for TV series.

AR: Yes, I am a sucker for maps too, and had a blast doing the maps for *Star Trek's Stellar Cartography*. My favourite sci-fi map maker has to be Geoffrey Mandel. He is the one who suggested me for the *Star Trek: Stellar Cartography* gig, and I worked with him on several maps — like the one for the *Firefly* TV series universe, and *Battlestar Galactica*, for Quantum Mechanix Inc. His maps are superb and are truly works of art.

DAL: Super, let's talk about your nebula art. How do you go about making a superb space art picture like "Serenity Nebula" (right)?



SERENITY NEBULA
ALI RIES ©2012

AR: I have been asked if I go into my artwork with 'an image in my head', like painters do. Nope, the fractal determines the artwork. I look at fractals and see a *potential* for a nebula. In the case of the "Serenity Nebula" I used several different fractals to create it. I overlap fractals until I see something I like.

On occasions I layer the same fractal in Photoshop and change its layer blending mode to Screen, or Multiply etc. to create depth and light. I also use dodge/burn to help bring out the inner beauty.

After I finish the basics, I will often use a favourite plugins from the Nix Collection: Colour EFX Pro4, which lets me change or enhance the overall colour of the image. Throw in some background stars, perhaps some larger ones here and there, and you have a finished nebula.

DAL: Looking at your pictures, such as "Iris Nebula", it's difficult not to draw comparisons with the great painters of impressionistic weather and light. Turner, for instance. Do you feel that your work would benefit from being seen very large — printed on a big 12 foot canvas, for instance, or set up as wall murals?

AR: I would love to see my artwork as a mural or on a big canvas. So far I have seen them 3' x 2' feet, but I think they could be *a lot* larger without losing impact. Especially since they have shown up on the big screen in movies and still looked great.

DAL: Yes, I could quite see your work adorning the walls of a big commercial planetarium, for instance, in the lobby. Or being back-lit on glass, so as to get the luminosity through them.

AR: That would be the ultimate high, seeing my

Pictures: "A New World" and "Moon Trackers", early work created with Mojoworld by Pandromeda.



artwork in large format at a Planetarium or gracing a big NASA poster.

DAL: Which other space artists do you admire?

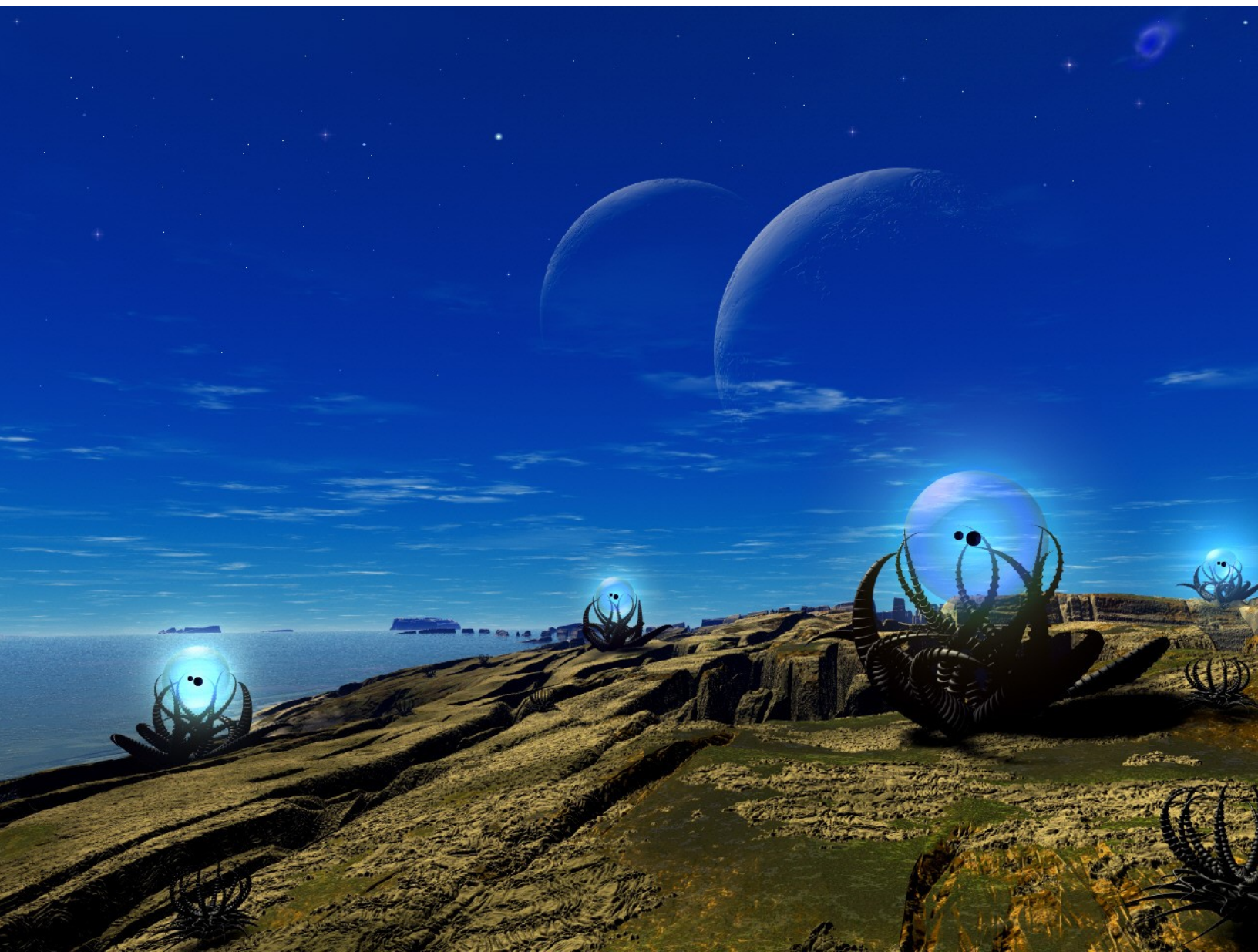
AR: There are so many great artists out there that have influenced me with their art. Deviantart is where I have met many of them. Not only space artist but science fiction artists. One of my favourites is Sebastien Hue with his futuristic scenes. Josef Barton creates wonderful cosmic artwork. Hameed makes space art and planets look so realistic. Chaloupka Lukas also uses some fractals in his artworks, but beautifully integrated with other space elements. Outside of Deviantart, the fantastic David A. Hardy has to be one of the most prolific and best known space artists.

DAL: Ah, yes, we have a long interview with his in this issue.

AR: His artworks always inspire me. And Rick Sternbach and Ron Miller are also two of my favourite artists.

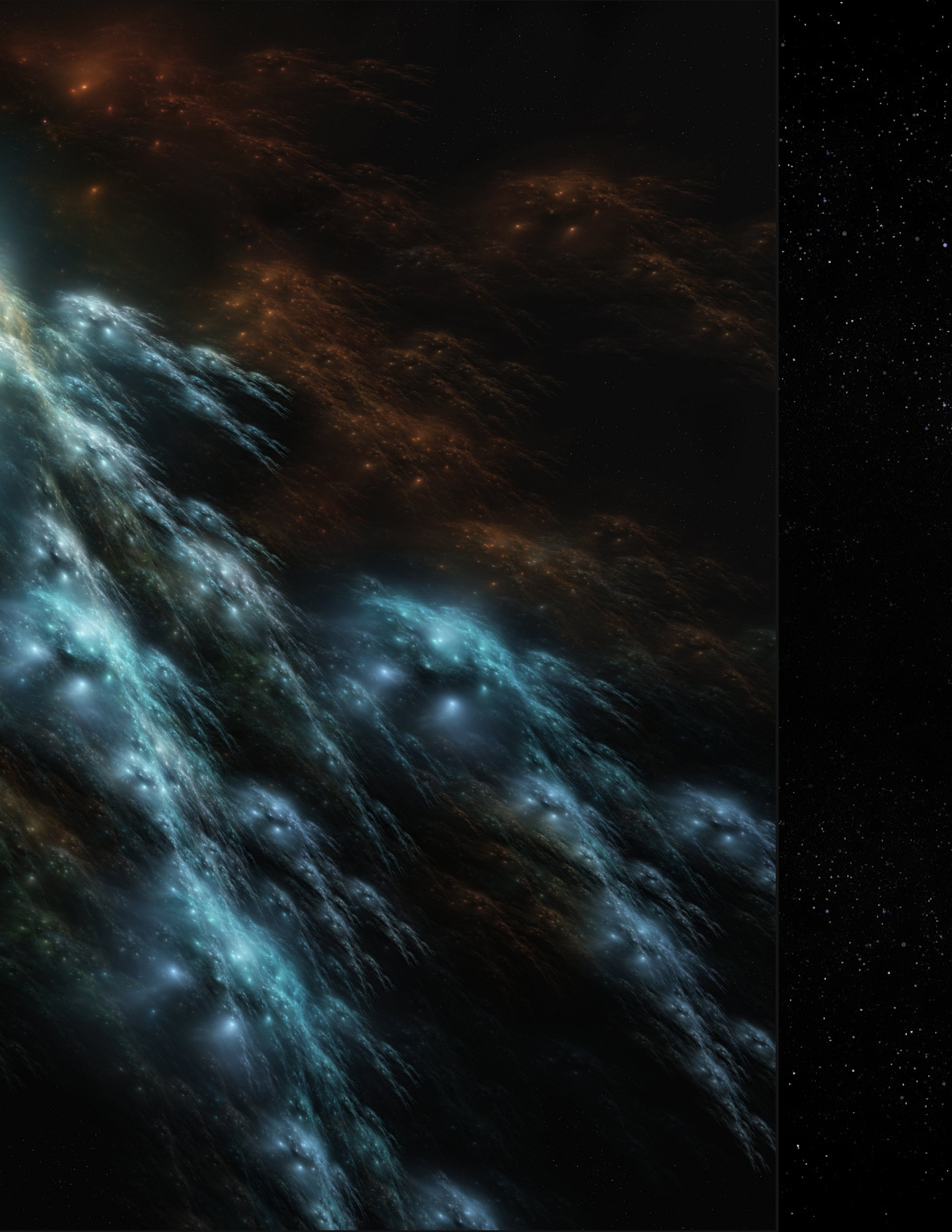
DAL: Super. I think your "Colony Prime" picture has great successes in evoking that elusive Lovecraftian sense of 'cosmic awe', and the latent horror that lies in the vast immensities that care nothing for humanity. That's often what I look for in a space picture, something where the viewer is made a little comforted about the grand immensities of space, which also serves to highlight the heroism of humans venturing into such spaces. So... tell our readers about this "Colony Prime" picture. It must have been rather spooky to work on, I imagine!

AR: "Colony Prime" is a piece I really liked creating, because it also had a deep ocean feel





COLONY PRIME
ALI RIES 2014



to it, as well as a space nebula. The points of light reminded me of space ships, or underwater submarines, maybe a colony of living algae, even perhaps small stars. You never really knew *what* you were looking at, thus leaving it open for the viewer to interpret. Plus, just by doing subtle changes to the colour one can change the artwork from cool and calm to hot and scary.

DAL: "The Tannhauser Gate" is fascinating to look at, like an Esher drawing. Are there real astronomical phenomena like that, where the planet appears to be in front of the planet? Or is more of a symbolic picture?

AR: I guess that in the Universe anything is possible, however I doubt that this could realistically happen near a planet. I like to think of it as perhaps a manmade wormhole or similar phenomena, of things happening that we have never seen before, with outcomes or intents uncertain. It leaves us in suspense of what might be.

DAL: You've come a long way, from early pictures "Moon Trackers" and "A New World", which we showed earlier [on pages 36-37]...

AR: Yes, they were in fact created with Mojoworld by Pandromeda, although many people think they're Bryce. Pandromeda's now a defunct company.

DAL: ... so you've come from that to commercial work seen in movies and book jackets. So what advice would you give to a budding commercial space artist in 2016? I mean obviously we're on the up-swing again, in terms of the market for commercial sci-fi and the new public/political interest in space exploration. We have the tools, the tutorials, the self-publicising and sharing platforms. But the way that artists juggle time, payment and inspiration is changing for artists, and it seems that being an artist is a risky as ever.

AR: My suggestion to them is to do what you love. If you try to do something that is popular, but not really what you like or are comfortable with, it will show in your artwork, and you will be frustrated. Don't be afraid to experiment and try new things and new ways to do it, you

might find a niche that you can fill and be innovative and happy with.

Another thing most people ask me is what to charge when they are first starting out and have someone ask for their work. What I always answer is: Work within the budget of your client. Be flexible. Be willing to help out the little just starting a business, as he will pass along your artwork to others and speak nicely of you — which can lead to more work.

Get a contract, lay out the terms and what is expected of both parties. Be on time with your work. The easiest way to lose a client and your credibility is to not have your work on time. Work ethics are everything in getting continued work.

DAL: What was your best sci-fi of 2016, and what are you most looking forward to in 2016? The same for science and science imaging. For instance, I hear there's a NASA mission to use a new space telescope designed to peer *right up* to the edge — or 'event horizon' — of a massive black hole. Not sure if we get the pictures on that one back to Earth in 2016, though!

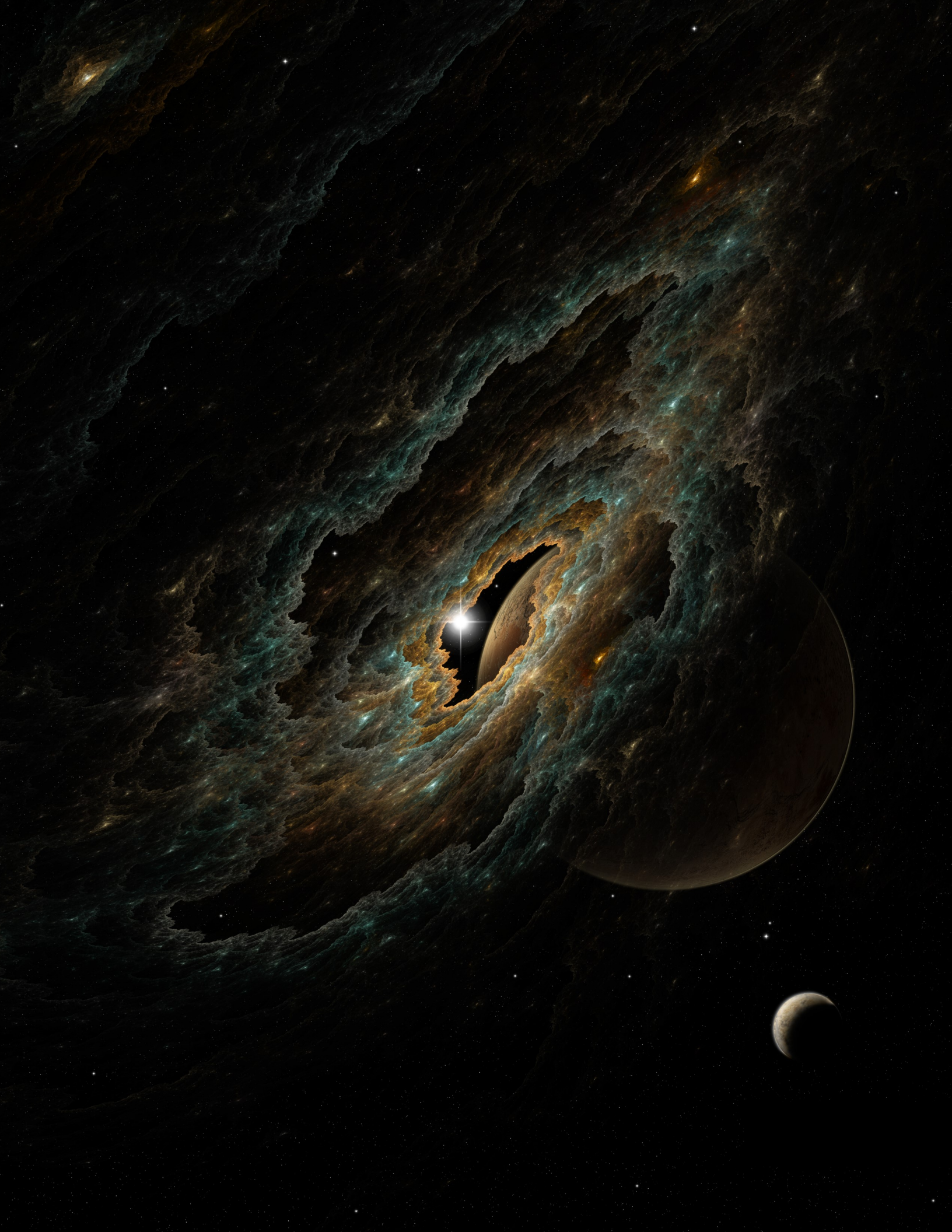
AR: The possibilities are limitless. Right now my main interest is the detailed pictures they have made of Pluto. I can't wait to see more of it. I am not sure what I am going to be doing in 2016, but I do know I am going to the 50th Star Trek convention in Las Vegas in August. I would not miss that for anything.

DAL: Ali, thanks so much for talking with us again for *Digital Art LIVE*.

AR: Thank you!! It has been a pleasure talking to you again.

Ali Reis is online as 'Casperium' at:
<http://casperium.deviantart.com/>

Picture: "The Tannhauser Gate" (detail).





Pictures: Ali Ries has had her nebulae work used as part of the big-budget *Riddick* (2013) movie, part of the popular *Chronicles of Riddick* series of action sci-fi movies. Her work is of a size that stands up well on even the biggest cinema screen.

Ali has also had work used as part of *Star Trek* books and map sets, and has contributed to Doug Drexler & Marc Zicree's major 2012 campaign on Kickstarter for *Space Command*.

Ali was also part of the team that was Emmy-nominated for visual effects on *Battlestar Galactica: Blood and Chrome*.

The background of the book cover is a dramatic space scene. It features a large, dark, curved structure in the foreground, possibly a space station or a large ship, with bright orange and yellow light trails streaking across the dark sky. In the distance, a bright blue nebula is visible.

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TOBIAS ROETSCH

Tobias Roetsch is an accomplished Photoshop artist who has recently produced a superb calendar of the Solar System, titled *A Portrait of the Solar System*. *Digital Art LIVE* caught up with Tobias for a short mini-interview.

Picture: "Dream" (2010)



DAL: Tobias, welcome to the new *Digital Art Live* magazine. We saw your recent pictures for the new calendar *A Portrait of the Solar System*, and knew we'd just have to do a mini-interview with you for the 'Cosmos' issue of the magazine. Before we talk about the calendar, tell us a bit about yourself and how you became interested in digital art, please.

TR: Thanks a lot! I'm thankful this opportunity. The story about myself is rather a short one. I'm a 28 year old self-taught German artist living in Dresden. I've been doing digital art for more than ten years now, working as a freelancer for more than six years. Like digital artists, Adobe Photoshop is my strength and the program I'm using most of the time.

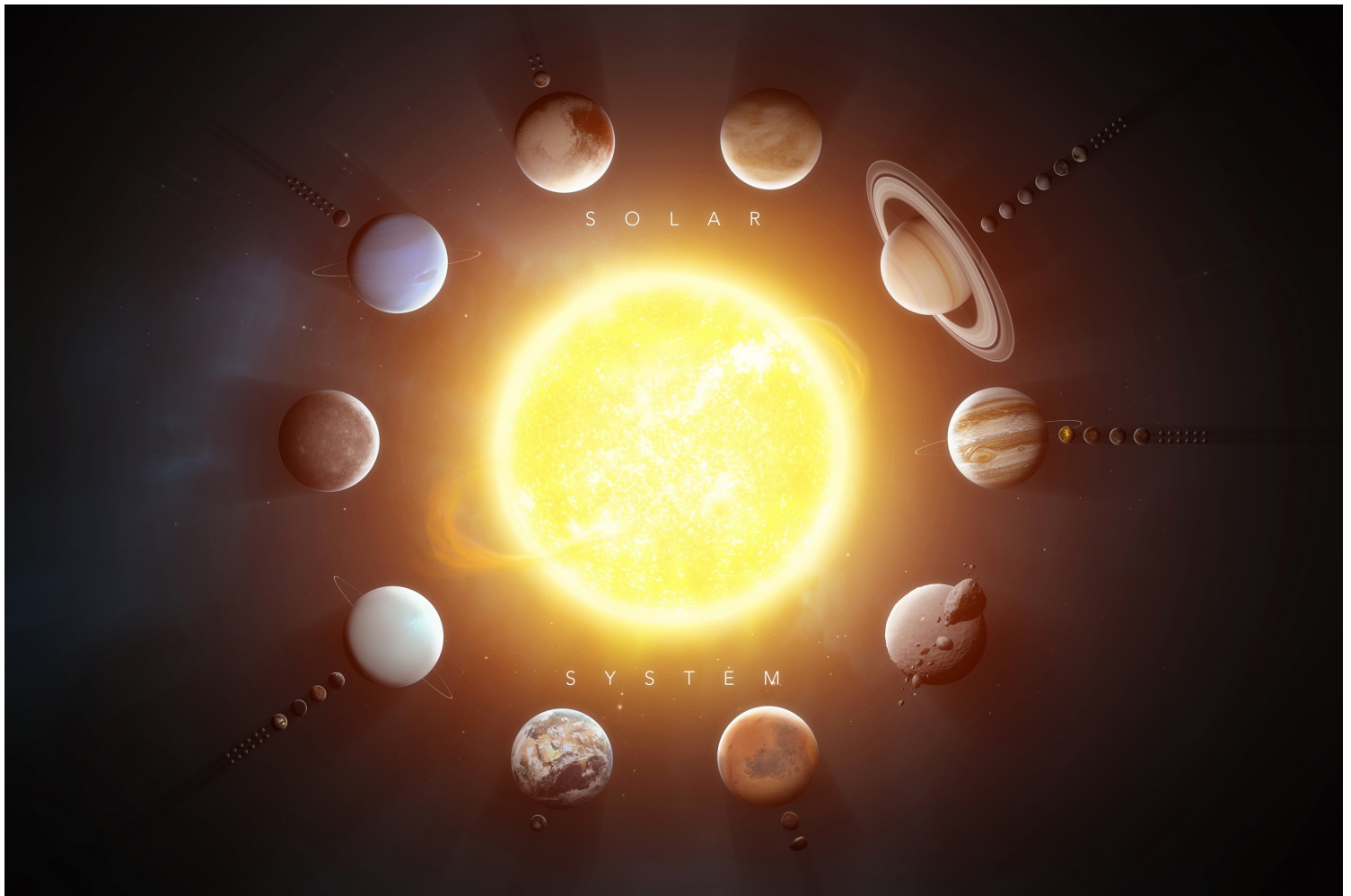
DAL: How did you first become interested in digital art?

TR: How I became interested in digital art is a good question. I liked the idea of doing art on the PC because it was quite new back then. And, of course, it was giving you way more possibilities than the traditional way of making art. I was amazed by the wealth of digital images I found online and wanted to do something similar myself. And here I am!

DAL: So, tell us about the new “A Portrait of the Solar System” project, please.

And then the work began. I decided to keep the same background for every image to make the planets stand out more. I liked the idea of having every planet — as well as the respective moons — displayed at the same size. Every planet has the same lighting conditions. I used NASA’s public-domain image textures to create them, but had to improve the images to make them fit my needs.

Placement of the moons was symmetrically at first, but it looked weird. Especially with the gas giants and their larger number of moons.



TR: I had the idea when NASA's New Horizons probe was about to reach Pluto. I had always wanted to create an image series for a calendar. Doing one about the solar system was a bit tricky, up until, then, because you need twelve images in order to fill the calendar. But with Pluto and Ceres we now have ten larger objects. By adding the Sun and an “all-in-one” image I had enough motifs for the project.

So I switched to a more random placement. There’s a little easter egg for the background: every individual picture of each planet has its own astronomical symbol seen blurred behind. It's quite obvious when you have all images next to each other, but harder to see when you look at the images individually. The project itself is done now. At the moment the only possibility of ordering the calendar is on my DeviantArt site.

Picture: "Monolith Valley"



DAL: Who printed the finished calendars?

TR: I'm actually still looking for a decent print service to cooperate with on that. I need one that ensures the quality I would like to see.

DAL: Yes, I've had poor results on a calendar before now. That was with Lulu.com. They do excellent and affordable paperback print-on-demand, with very nice colour on the card covers. But I found that they're not so good for colour calendars, in my experience. That was about three years ago now, so maybe they're improved since.

TR: Single prints for the calendar are already available too, via DeviantArt, in case you are not looking for a whole calendar. The quality is nice on those.

DAL: Yes, I guess the DeviantArt community won't stand for anything that's lesser quality, in that respect. Are you still using a combination of Blender and Photoshop for your work?

TR: Actually I've *only* been using Photoshop for the last few years. Maybe I'll come back to Blender, or 3D in general, one day.

DAL: So... was your giving up Blender anything to do with your opinion of the direction that Blender and the Blender Foundation are taking? Or was it just to do with your technical skill getting to the point where 3D was no longer needed?

TR: Well, what I liked about Blender is: it's free. You usually have to pay quite some money for software, so it's cool to have a free alternative. On the negative side, from my point of view, Blender is *very* different to programs like Cinema 4D or 3DS Max, when it comes to the interface and handling. I was used to Cinema 4D, and so when I moved to Blender I had to really fight to change the way I worked.

DAL: So, back to the cosmic. Are you excited about the possible "tenth planet"? "Planet X", or



Yuggoth, as I like to call it! The presenter of one of my favourite podcasts, *AstroCast* — on astronomy and space science — seems pretty sure it's out there. And she's a major space educator and a working university astronomer.

TR: It's super awesome! That's exactly what I love about space: there are no limits. Everything seems to be possible. So — without having a clue about how to figure out if a tenth planet is out there or not — 'yeah, why not?' Though I only wonder why Hubble isn't able to find it? But maybe it's just a matter of time.

DAL: Yes, if it is found then you could add a new page on the calendar for 2017, for the new planet. Do you have any other plans for additions to future editions?

TR: Currently the project is based on facts, on actual images, and therefore it gives a 'real' image of the solar system. Even if there *is* a tenth planet, we don't know how it might look

like. Pluto for example looked totally different from what I thought it would look like.

DAL: True.

TR: Maybe once we have some more information about the new planet, an artistic vision *could* be possible. But for now I consider the calendar project to be finished.

DAL: OK. So is DeviantArt a good place to sell content, like the calendar?

TR: It's a good print-on-demand service and I have already sold a lot of prints there, and even bought some from them for myself.

As I said earlier I'm currently looking for another service that ensures a more unique calendar with larger images. When I released the project I thought I had a good one for a bound print edition, but there were some problems and so I cancelled it at that point to look for alternatives.



DAL: Did you approach local printing firms?

TR: Well... one solution *could* be to work with a local printer and send the calendars away to buyers myself. But in that case I would have needed a certain amount of orders, to have something to calculate with and to help me to bargain with the printer.

DAL: Right. How is your wider freelance graphics business going, if I might ask? Has it changed or developed since it started, which was six years ago now?

TR: It's now going quite well. I took some major steps upward in 2015, which was maybe linked with the re-launch of my Web homepage at www.gtgraphics.de in March 2015. But freelance work can end anytime, if you don't pay attention. It's a never-ending fight to get the work in. The good thing about having lots of commissions is the money. The bad thing is the lack of time for my own projects and images — especially since there are what usually lead to good publicity and new commissions. So therefore making my own work is an important part of the entire business.

But I love what I'm doing and I can live from it. Is there anything else that a creative could want in life? From my point of view, it's way better than having a job you hate but which makes you "rich".

DAL: We've also showing your 2010 "Dream" picture, which opens this mini-interview, because it seems to me to most evoke the poetic narration that Carl Sagan wrote and delivered for his classic TV series *Cosmos*. What is the story behind this picture, please?

TR: I took the base photo for it myself, during a commissioned photo shoot. At that time I did not have any special plan for using it right away. What makes "Dream" special to me is that this was the first day-to-night image I had made. The base picture actually shows a midday scene. So it was quite a lot of fun to turn it into a night scene, and also to add some sci-fi feeling with the help of the planets. On the title, "Dream", that is related to my own wish to have a campfire with a view like this.

I'm still dreaming of something like this.

DAL: Well, I hope you find it one day. In the meanwhile, what has inspired you in the past year, in art or sci-fi, or the world?

TR: 2015 was a bit of a change for me because I started doing more fantasy landscapes as well, and less planet or sci-fi scenes. I seek most of my inspiration from other art and movies, of course. Maybe the change to fantasy was caused by watching too much *Game of Thrones* and *Black Sails*.

DAL: Ah yes, the historical pirate series. I heard it had a clunky first season, like many American TV series, so I didn't watch that. But it was very well reviewed for the second season — so I shall watch its second season at some point. The third season is only just starting to air now, I hear. I just love the way that the quality threshold of TV series in fantasy and sci-fi just keeps going up, as the old companies battle the new upstart companies.

TR: But it's not like seeing a castle means I *have* to do an image with a castle the very next day. It takes some time to develop ideas. I couldn't really tell you why I'm doing *this* or *that* type of scene in the particular moment. The way the image comes out at the end might be linked to my current feelings and thoughts — so perhaps I should ask myself why the images are dark most of the time! */laughter/*.

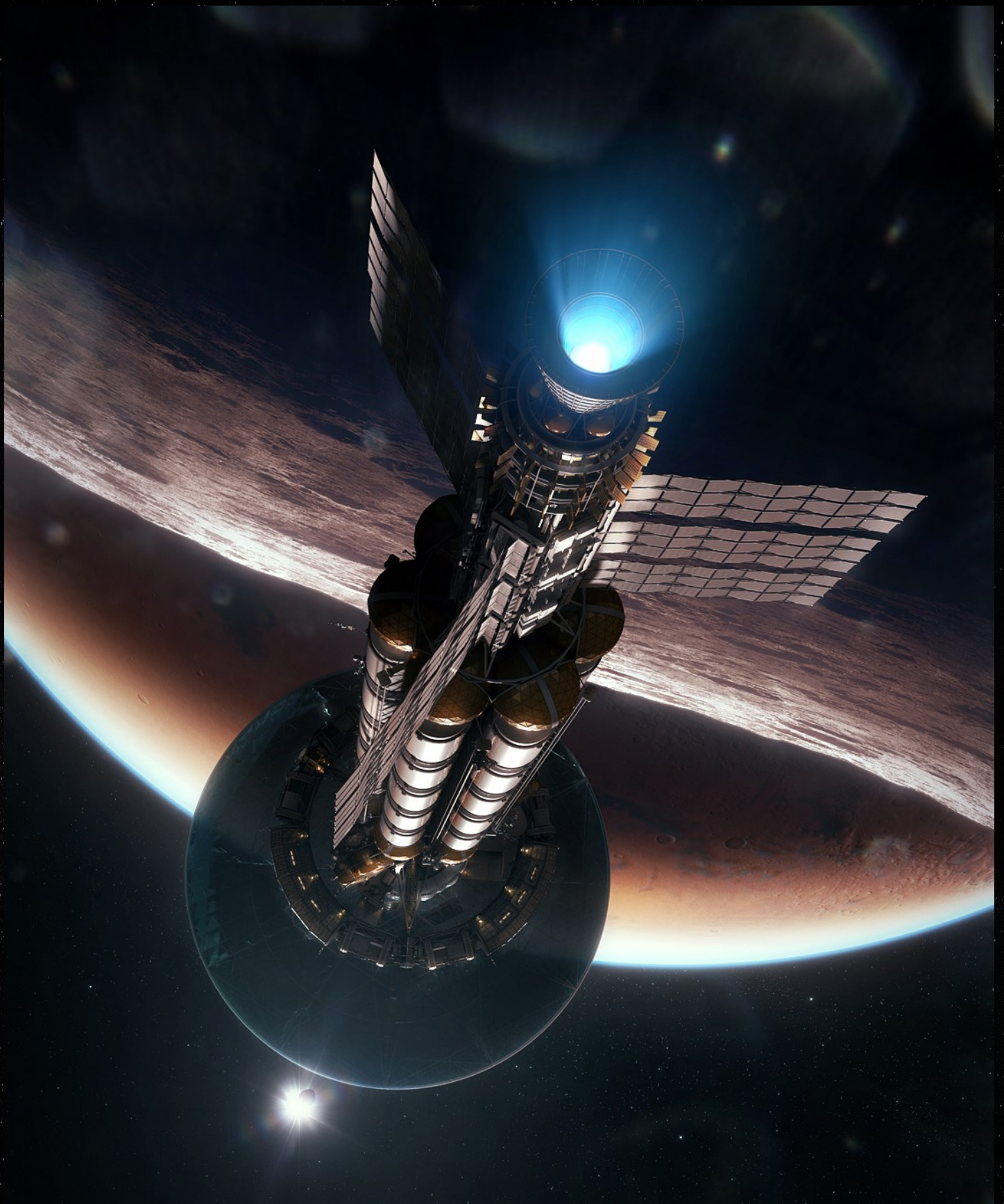
But your question was on the topic of inspiration: so... yes, the two mentioned series inspired me — just as much as the New Horizons space mission did. Of course my own photography trips into nature are always a key source of my inspiration as well. I'm a passionate photographer.

DAL: Great, well thanks again for giving us an interview and updating us on your work.

TR: You are welcome! Thanks again for this opportunity!

Tobias Roetsch is online at:

<http://gtgraphics.de/en>



Picture: "Kronos 1 Mars Arrival" by Tobias Roetsch, with spaceship 3D design by Maciej Rebisz of Poland.

TERRAGEN

With the 3D software Terragen 4 coming soon, we thought the “cosmos” issue would be a great chance to talk with Oshyan Greene about the landscape software’s new horizons, and also its use in planetary and space art..Oshyan is Business Manager of Planetside Software, maker of Terragen.

DAL: Oshyan, welcome.

Oshyan: Thanks. Glad to be with you again.

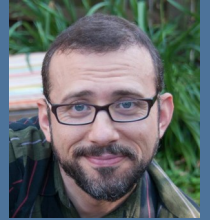
DAL: Now for those who haven't heard about Terragen before, tell us the gist of what it is.

Oshyan: Terragen 3 is an extremely flexible and powerful 3D environment generator, and is also used for animation.

DAL: What can you control, as you create your realistic environment? Can you create an entire planet with Terragen?

Oshyan: You can create entire planets with it, and you can also create localized scenes. You can load external objects, external terrains, image-based textures. But the real power in Terragen, I think comes from the internal procedural functions. Fractal, noise functions, and that sort of thing — because they're generated mathematically to a high degree of precision. So you can create really small details, down to level of a tenth of an inch, and then all the way out to a planetary scale. And the same functions work on small and

Picture: "Kyuutai no Karuma" by AOKcub of Japan. Terragen 3 and MikiMiku Dance.



OSHYAN GREENE

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TERRAGEN |
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large scales so it allows you to basically create environments as detailed as you want them to be and as large-scale as you want them to be.

There's a built-in atmosphere model, that's a complete planetary atmosphere model, that wraps around the planet in a realistic way. You can create volumetric clouds on the planet with realistic shading, import objects and create huge populations for forests and grass and all that kind of stuff, also import of character models.

You can basically create any environmental

scene and then place your models and your characters in it to create a finished piece.

DAL: Where does all this power get used?

Oshyan: It's used in multiple industries. It's used in visual effects. It's used in advertising, fine art. It's used in virtual reality and many other settings. So it's a very flexible tool.

DAL: That sounds so comprehensive. I knew that Terragen users can make at least one planet. But can you create a whole solar system?

Oshyan: In theory you could, yes. I haven't seen anybody create a complete solar system, but it is possible. You can create multiple planets, putting them at realistic distances from each other. So if you wanted to animate flying from the surface of one planet to the surface of another planet, you can do that.

DAL: So as well as creating fictional terrains and worlds, Terragen can import real world terrain data-sets. What are some of the more notable projects that you've seen where Terragen has been using this type of capability?

Oshyan: Yeah, that's a really cool capability. We've had especially good support for real world terrains in Terragen 3 and some of the updates to Terragen 3 have improved that. So most recently I've seen a couple of people doing high-resolution scans. Like, they'll have a drone flight or something like that in a location and scan the area, and then geolocate that and export that into a format that Terragen can read. Then you get this incredibly detailed terrain, you can even see individual rocks and stuff like that.

So that's one example of the capability. There's the classic scene that I created some years ago of the famous St. Helens volcano that I think is pretty iconic. Because it's such a recognizable mountain, with that huge crater in it and everything like that. There's really good high resolution data available for that and many other areas and Terragen supports it all natively. Very easy just to bring the data in and then start texturing it and adding all of your objects and plants and everything like that.

DAL: This is the real reason why people buy high-end drones, to get a data-set so that they can import into Terragen later on! Now I know.

Oshyan: Some people, yeah. Some people are definitely doing that.

DAL: Yes, that sounds really cool. Tell us a little bit about Matt Fairclough, who's the lead developer for Terragen, please.

Oshyan: Yes. He's the software architect and also the founder of our company. We're coming

up on 20 years pretty soon here of him working on this. He started it in college actually, as a little hobby project on the Amiga. And he moved over to the PC at a certain point and just kind of put his whole creation out there and it gained a lot of interest at the time. He is quite frankly a brilliant guy. He's very interesting and friendly. Nice fellow. I first met him probably 10 years ago when he was coming through the Bay area and we got together for a drink and just hit it off pretty well.

So he's a very approachable guy and just loves to talk about how mathematics and computer graphics relate to the real world. That's his real passion. I think there's a lot of use of procedural noise functions and fractals and stuff throughout the computer graphics space and throughout the industry. But his approach to it, his view of it is very artistic and realism-focused. So he will go on a drive through the mountains and be looking at the terrain, thinking about how he can represent these subtle details in a mathematical way. And how to create tools to put all of that in the hands of the user. He's just always thinking about that stuff and he thinks about it in a very unique and creative way.

DAL: I think that is the unique selling point about Terragen, about the subtle details that Matt thinks about. Like you were saying a bit earlier about the ozone layer, that's something I would never have considered of trying to simulate in a terrain generator. But Matt's thought about that.

On the Terragen 4 site, there's an example of the difference with and without that ozone layer and it's noticeable. There's some noticeable realism that's added to it, but yeah, we'll talk about that a bit later. Terragen's also available for the Mac as well, isn't it?

Oshyan: That's correct. We're on those two platforms, Mac and Windows at the moment. We also have a Linux render node. We may have some more developments for Linux in the future, to talk about at another time.

DAL: Okay. Now Terragen's being used

Picture: "Somewhere" by [Dadrian](#).
Terragen and Photoshop.



somewhere

regularly in major cinema blockbusters such as *Star Wars*, *The Force Awakens* and Ridley Scott's *The Martian*. Now even the industry audience is not necessarily always notified when Terragen is used. But have you had some moments when you've been watching a film or a TV production and spotted some Terragen work and thought, "Aha, I recognize *that*." Have you had a few of those moments?

Oshyan: Absolutely, yes. We were actually contacted about *Star Wars*, *The Force Awakens* by one of the art directors at Industrial Light & Magic, kind of letting us know that he had worked on it. We just haven't had a chance to get details yet, but we're hoping to get some more details on that in the future. A lot of times what happens with the major films is it's hard to get permission from the studios — who own all the rights — to really show images and talk about that stuff. So that's kind of the challenge there, and why there isn't more information. But we're definitely working on that because we're so excited that Terragen was used in *Star Wars*. So when I watched it, I was definitely looking for what some of the things might be in.

You know, you see a few things that you wonder, but the quality of the work and the integration of it is *so* high level on *Star Wars* and *The Martian*, you don't know for sure. But there are definitely times when I see something that I'm not sure. You know, "Terragen *might* have been used on it, I wonder..." Again, the results can be so photorealistic with the right artists and the right approaches to integrating it all together that it's hard to know sometimes.

But we've had Terragen used in a very wide range of films and other media over the years. There's a good reference for that on our website under the showcase section. I think it's something like maybe 40 films, major films by this point, that we're aware of. There are probably a few that we're not aware of.

Even now there are plenty of examples where, to the average person, Terragen output is indistinguishable from reality. That happens quite a lot. There are actually a number of cases of Terragen images being passed off regularly as

real photos, on social media and stuff. There are some classic ones. A few years back, one of our users...there was a total solar eclipse and right around that time, he had created an image some years back that was an eclipse from space. But it started being passed around on social medium without his name attached to it, as if it was a real photo from the International Space Station of this recent eclipse and gained an incredible amount of exposure because the eclipse was such a hot topic at that time.

So that's just one example, but there are actually many of those such examples. There's another one that's been debunked by Phil Plait, I think is his name, who's an astronomer at badastronomy.com or something like that. He basically debunks the bad science that's out there, especially space-related stuff. There was image that was supposed to be like the eclipse from the North Pole or something... I don't why it's *always* eclipses...but anyways that was another example of that.

DAL: Now you've optimized the forthcoming Terragen 4 to be faster and more interactive and easier to use. One aspect is the ray-traced preview. Tell us about this.

Oshyan: So real-time ray-tracing is something that's fairly popular at this point. There are a lot of products that are doing it. But I'm not aware of an environment modelling program that's doing it, to the degree that we're doing it. So we're basically creating a progressive, real-time, ray-traced view of your Terragen scene. What it does is, it makes the previews so much more interactive. You can move the camera and as soon as you're in your new camera perspective, the detail starts refining... like as you're moving, the detail is lower. But it refines almost instantly and especially depending on the CPU power you have available. But I've got a fairly old i7-2700K and yet the new ray-trace preview works brilliantly on it.

Essentially you just get real-time feedback on anything that you're doing. Anyone familiar with Terragen from the past, they'll know that the preview window takes some time to update. There's a lot to calculate. But with this new ray-

tracing technology that we're taking advantage of, everything just gets *so much* faster. So you adjust a cloud and you can see the height of it changing in real-time. See the shading characteristics changing. So you're able to iterate, and to make progress on your scenes so much faster because of the feedback just being instant. It's right there. It's really pretty incredible. It's really just getting started, too. This is sort of a first iteration of our ray-tracing

Oshyan: One of the sort of challenges of using environment modelling tools in general in Terragen and in the past to some degree is getting real explicit control over the environment. Terragen, as I mentioned before, has these very powerful procedural modelling tools. You can create very detailed terrains with realistic mountains and all this stuff. But if you want a mountain range here or a lake here or whatever, there are tools to create it. We've got



Picture: Demo render from Terragen 4, by Luc Bianco.

technology and it's based on some very well-respected technologies in the industry. And the results are already fantastic and they're only going to get better from here.

DAL: That sounds like a real advantage. Does it take advantage of the GPU?

Oshyan: At this point, it actually doesn't and yet it's still *really fast*. So what's exciting about that is that we still have the GPU to take advantage of in the future. So it's fast now and then, if and when we're able to fully take advantage of the GPU, it could be even faster than it is already.

DAL: Now you've hinted at some new terrain editing tools. Can you give details about these?

a node called the simple shape shader. We've got a painted shader and some other things.

But there's still some difficulty in getting certain kinds of explicit features. So we're really looking at adding some new tools to make it easier to make explicit changes to the scene. Especially for terrain, but also for other aspects of the scene in the future. So there'll be some initial added tools and functionality in Terragen 4 and then we'll continue to improve on that. As we have with Terragen 3, we've released multiple updates and — same as with Terragen 2 — we'll be providing ongoing updates with Terragen 4, that will improve on those capabilities. We're definitely looking forward to talking more about that and showing more in the future.

DAL: Now I've seen some of the renders done on the alpha version on the terragen4.com website. Some of these show some amazing cloud scenes. What makes these cloud scenes that I've seen pop out more? Because they do look different and more realistic than what I've seen before from many programs, actually. There's something new there, isn't there?

Oshyan: Definitely, yeah. So we've always been focused on realism. We've had what I would say is the industry-leading cloud shading model up to this point, but there's always improvements that can be made. So a lot of the quality that we have in a current version of Terragen, Terragen 3, in the cloud shading is essentially... we're taking shortcuts. So we've got these scattering settings and scattering approaches in the shading model that are approximations of how the actual cloud shading works. Clouds are one of the hardest problems in computer graphics today.



There's other challenges like subsurface scattering stuff. Skin is a hard problem as well. But clouds I would say are even more difficult because what happens in clouds is, there's all of this scattering happening inside the cloud. It's millions and millions of tiny water droplets. If you think of a water droplet, it's a refractive thing. So light goes in on one side of it and then it gets refracted. In other words, it comes out of the water droplet at a different angle. So the overall look of a cloud is the net result of all of this scattering going on through millions and billions of water droplets.

So you can imagine trying to simulate all that. It's tremendously difficult and we haven't directly simulated it in the past for that reason.

But Matt, in his genius, came up with a way to start to actually simulate some of that scattering going on. So we've got what's called multiple scattering now in the cloud model. And that's what gives you that incredible sensation of realism and the look of real water vapour cloud, just that real sense of what a cloud is. And that it's not a solid thing.

You just get that sense of light kind of scattering around the interior and coming out in realistic ways. The edge, you get that glowing edge effect, like the silver lining effect. But you also get...like in big cumulus clouds, an interesting thing happens where the edges are a little bit darker. Which is a little bit non-intuitive, but it's again due to how the scattering works in water particles in clouds.

So we're basically starting to simulate some of those multiple scattering physical properties more closely in the new versions of the cloud shading and the results are pretty tremendous. Realism-wise, it's a huge step forward and we're pretty excited about it. It's one of the major standout capabilities of Terragen 4.

DAL: Terragen 4 includes some lens flare effects. What kinds of lens flare will we see?

Oshyan: Yeah. A lot of people I think see this as potentially a post-work effect, something you would add in Photoshop or something like that. But we're adding image bloom and starburst effects in Terragen 4 — because the high dynamic range that Terragen 4 generates and the occlusion...where the light will pass by an object...the way we're handling all that natively in application is really going to give the absolute best results for those kinds of effects.

So you have bloom, which is where in photographic terms you have... a high intensity of light starts to bleed into other areas of the frame, due to the intensity of that light. So simulating that in Terragen, it just gives a nice glow, the sort of ethereal quality to the light. It adds a nice degree of realism, it also adds... with higher settings, you can get a real fantasy feel to things and what not. So it's all controllable of course, the bloom. Then the starburst effect is

what a lot of people traditionally think of as a lens flare, so to speak, where a light source will have these kind of points coming off of it. We're going to have some controls in there for how many points the starburst has and some other adjustments to that as well.

The starburst, when you see it you know, it just reminds you of a photo of a bright light source taken...photographed with a camera. The nice thing about it is that it works across the whole image. And the bloom effect as well. So any area where there's extremely bright light will be affected by these new features. Starburst in particular is pretty cool. There's an example again on terragen4.com. We have a video that shows some of this stuff happening.

So one of the things you see is that, when the light source goes behind an object...let's say, like the leaves of a tree... the starburst is correctly hidden by that and it does so in a properly dynamic way. So it doesn't just turn on and off. It actually gets brighter and dimmer appropriately along with the occlusion of the intensity of the light.

Then you can also get the starburst effect off of specular reflection. So for example, water. A lot of times... I'm sure many people are familiar with, you go out to the lake, you go out to the ocean and the sun is coming down low on the horizon and there's just all these beautiful sparkles out there. This is an effect in Terragen that simulates that really beautifully and just adds this really nice realism to Terragen renders. The effects are very customizable, in terms of how sharp and soft you want them, how big you want the effect and all that kind of stuff. They respond very realistically to the brightness and size of all of your light sources as well.

DAL: And because it's inside Terragen, that gives you a lot more control than... over trying to do the same thing with post-work.

Oshyan: I would say to a certain extent, yes. There are post-work lens flare filters that have a lot of different kinds of flares and you can change all kinds of different things. I think the

main advantage of doing it internally is that it actually cuts down on the amount of work. There's definitely flexibility and control with what we have in Terragen 4, but the really cool thing is it all works automatically. Like, you turn it on and it responds correctly to the colour of the light source.

So when there's atmospheric attenuation... you know, like a sunset... when the sun is low on the horizon and the light source turns orange, you're going to get an orange glow and an orange lens flare instead of white, if the colour of the light source is white. So it correctly responds to everything in the scene and you can just turn it on and it immediately adds this sense of photographic realism.

You can tune it, like I said, to your preference. But the fact that it's sort of "just works" is the great thing about it, that it responds realistically to everything you're seeing. Whereas if you were doing it manually in Photoshop or another application, a lot of times you'll have to manually place your lens flare over where the sun is. It's not going to occlude correctly because it has no knowledge of where objects are in the scene. It's all being done on a 2D image at that point so you don't have all this context that we have.

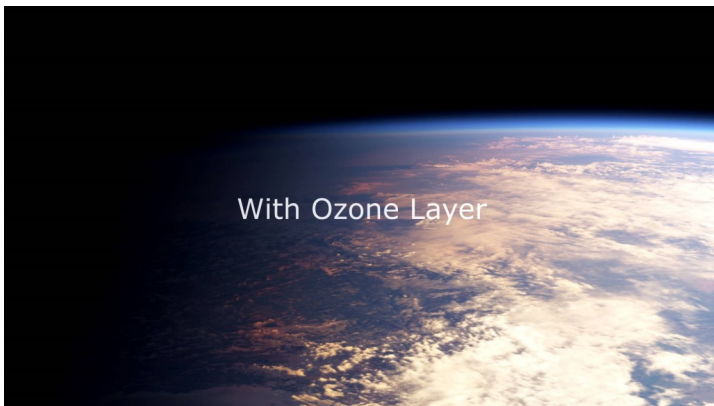
The other major thing is that it's all working in high dynamic range within Terragen. We render out with a great amount of dynamic range. You can output to EXR and stuff like that, so you get 16 bits per channel there. But doing it internally allows the lens glow and starburst effects to operate directly in that spectrum. And you get a very realistic result out of that.

DAL: Now Terragen 4 also allows the simulation of an ozone layer. I was going to ask you actually, where did Matt get the idea to do that?

Oshyan: Matt is, as I said earlier, he is an observer of the natural world and very fascinated by it. And really wanting to simulate it and depict it as closely as possible in the computer. So he read up on atmospheric research and stuff like that to create the original Terragen and also the newer Terragen 2

and 3 atmospheric models — and we've been improving it the whole time. He was aware that there is a potential major contribution from ozone in particular as a component of the atmosphere.

So there's all these different components in the atmosphere and there are traditional atmospheric shading models that are nowadays even used in games and stuff like that. But the way that Matt has implemented the atmosphere and the knowledge that he has gives the Terragen atmosphere a bit of an edge in terms of realism. And now adding the ozone factor, as you can see in the images we've provided in the videos, it just adds an extra little bit of realism.



Ozone is a component of our earth's atmosphere. Many people are familiar with it from the scare back in the 1980s, around the holes in the ozone layer and all that kind of stuff. So ozone is a natural part of our atmosphere that happens to just scatter particular wavelengths of light in a different way than other parts of the atmosphere. So adding this simulation of it into Terragen just adds an additional degree of realism.

The nice thing about it is it's completely controllable. So you can not only turn the effect on and off, but you can adjust how strong it is. So you could even create a very interesting sort of fantasy world where the amount of ozone was *really* strong and you get this very unusual colour to the atmosphere. Or you can just have a very subtle effect that kind of just adds a little bit of darkening in the higher sky at sunset. Just a little bit of blue and darkening and it just adds a little touch of greater realism.

DAL: Moving on from Terragen 4, I noticed in the PlanetSide online forums that one particular post that's had a lot of attention. And it's a fractal, procedural erosion shader by Blinkfrog that's in beta and it's free. Which sounds great. So tell us a little bit about this shader and why it's caused a bit of a stir.

Oshyan: Yeah, I'm really excited about his work. So Blinkfrog...his real name is Daniil Kamperov... and he is a *very* smart and creative programmer. We talked a little bit about his work early last year when we were first starting our software development kit, our SDK. He is the first person to produce a public plug-in with our SDK. This is a plug-in for Terragen 3 and this is completely based on his own work. Procedural fractal erosion is sort of a holy grail, so to speak, for many in the landscape modelling and rendering industry. There have been one or two other people who have shown this kind of capability in the past, but nobody had ever actually *made it public* — where the average person could use it in publicly available software.

So this is the first time that procedural erosion is available for anyone to use and it's fantastic. As you said, it's *free*. This is the real difference. You can create great-looking erosion in World Machine or many other dedicated terrain modelling packages. But you have to export it in a format that is a finite resolution. You don't get as much resolution as you might want.

So let's say you make a terrain in World Machine, you erode it and you export it to Terragen. It'll look great *from a distance*, but as soon as you're closer than 100 yards from the terrain, the effect breaks down. And likewise it's a limited area. So let's say it's an 8,000 pixel square terrain that covers 20 miles square. Well, as soon as you get past that, if you're going out for an orbital shot or something like that, you're going to have to have additional terrains out there or tiled terrain or however you're going to do it. You have to work around the limitations of both the area and the detail.

So the cool thing about this new fractal procedural erosion is that it is unlimited.

Virtually unlimited, at least. It can cover thousands of square miles. It also works down to like the level of just a few feet. You get detail at as large a range of scale as you want. And it just works across procedural terrains. It works across basically any terrain in Terragen.

You can mask it. You can apply it in various different ways. There are lots of controls and settings for it. It's very configurable. And it essentially gives you realistic erosion features on an unlimited range of scale to add detail, both large and small, to your scene. It's just something you can't get with traditional raster erosion methods like you have in other software.

DAL: Now you're excited about virtual reality, which Terragen 3 can handle. You want to do a call out for more spherical renders from users, don't you?

Oshyan: Yeah. We're very excited about virtual reality. 2016 seems to be the year that VR is really going to take off. Oculus Rift is coming out very soon. The HoloLens and lots of other VR headsets are happening. Obviously there is Google Cardboard and there are many other options that are becoming more and more available. We added the spherical camera in an update to Terragen 3 and that allows you to essentially create VR content right now. It's available in the professional versions of Terragen 3. You can render your scene out to spherical panorama and then if you have a VR headset, load it up and look around your world in 360 degrees, which is really a cool thing.

In particular, it solves some problems with VR where, if you're trying to actually film on location in VR, filming straight down and straight up are big problems and there are other issues with trying to get a full 360 environment. You don't have to stitch or anything like that when you do it natively in Terragen. So we're really excited about VR and we've seen a few 360 degree immersive environments from people in the community, but we're really wanting to see more. So in the next few weeks we plan to organize a contest.

So you'll be able to win a copy of the upcoming Terragen 4, Terragen Professional Plus Animation, the highest version available. We're going to be basically accepting submissions from people for high-quality virtual reality spherical scenes.

So we haven't worked out all the details yet, but we're encouraging people to come and follow us on social media. Our Facebook is facebook.com/planetsidesoftware. We're also on Twitter, twitter.com/terrigen or @terrigen.

DAL: Sounds good. Is there anything else you'd like to mention that Planetside is working on at the moment or in the community?

Oshyan: Yeah, definitely. There's a lot going on. We're always very busy.

Most recently one of our outstanding artists, Luc Bianco, was chosen as the Xfrog Artist of the Month. So he's been in the Terragen community for almost as long as Terragen has existed, probably the longest running user of Terragen. Xfrog did an interview with him. I think it's one of the only if not the first interview that I have seen. And you really get more information about who he is, and what his inspiration is, and everything. He's just a really inspiring and talented guy. If you go to xfrog.com, there's an Artist of the Month link and you can find out more details about his process and there's also some Terragen 4 renders that he has created as part of the alpha test process.

In the more immediate future, we are going to be releasing a minor update to Terragen 3, the 3.4 release. We have improved the object reader capability a little bit, added some compatibility fixes that allow you to load a wider variety of objects, .OBJ format features. So the opacity texture, index of refraction, and some other things now load more easily and more correctly. As well in version 3.4, we've added an option to output 16 bit TIFF and compressed TIFF when you're doing animation.

Previously it was either eight bit TIFF or EXR output, which is high dynamic range. But the 16 bit TIFF option is a little bit easier to work with

for some people. And the compression makes it easier to render on render farms, for example, where you have a lot of data that you have to download, a compressed image file is going to be a faster download. So that's handy. Then just a number of bug fixes, some crash fixes and stuff like that. And as always with our point release updates for Terragen 3, this one is a free update. Version 3.4 coming in the next few weeks.

DAL: Can folks get a pre-release of Terragen 4?

Oshyan: You cannot actually use Terragen 4 at this time. But we were surprised when we first started talking about Terragen 4, that a lot of people wanted to just jump on it right away. They wanted to go ahead and upgrade right away. We realized that we should really be giving people that option, as well as anyone who's purchasing Terragen 3 now to have the option of getting Terragen 4 upon its release...you know, they can choose that. So anyone purchasing Terragen 3 now...the option with maintenance...we're offering a one-year maintenance package with any new purchase of Terragen 3. And that includes a free update to the initial release of Terragen 4.

There's also an option for anyone who's an existing user of any version of Terragen to upgrade to Terragen 3, and add a maintenance package to that. So it's in our online store. When you go to do your update...you have to be logged in to your account if you're doing an upgrade. And if you have any problems with that, you can contact us. You can just email support@planet-side.co.uk if you have any questions about your account. Anyway so you just have to log in and then you'll have your upgrade options and on the product details page, there'll be an option to add maintenance.

So you add a one-year maintenance package and you get a free update to Terragen 4 initial release, which is going to happen in the second quarter of 2016. So sometime in the April-May-June time-frame is when we're going to release Terragen 4.

There may be some other opportunities to get an early look or even a little bit of an early taste of Terragen 4, for those who are pre-purchasing now. So that's a little bit of an interesting incentive, but we don't have anything officially announced on that yet.

The last thing I want to mention is that all of our

Pictures: Cloud demo renders from Terragen 4.



videos that are showing off the features of Terragen 4 are being rendered by our render farm partner, Pixel Plow, who are a fantastic company to work with. It's a very simple, easy-to-use and affordable render farm. We encourage everyone to check them out and get some high resolution renders done or some animation. We'd love to see more animation and it really is affordable to do. So they're a great partner to work with and really helping us to show off Terragen 4 at its best.

DAL: Oshyan, thank you for your time. Terragen 4 sounds really exciting. I think there's a lot of enthusiasm about it, so folks don't have to wait too long before they see it. Thank you again.

Oshyan: Thank you. It's been a real pleasure and we're definitely very excited about Terragen 4 and looking forward to sharing even more details with you. There's more features we haven't talked about and just keep an eye on terragen4.com for all those details as they're released.

DAL: Thank you.

Oshyan: Thank you.

Terragen 4 is due for retail release sometime in the April-May-June period of 2016. Terragen 4 is going to be faster, more interactive and easier to use — with new tools to create and explore your scenes more quickly and intuitively than ever before. Full details are online at <http://terrigen4.com/>

You can also find out more about Terragen by linking the Facebook page at <https://www.facebook.com/planetsidesoftware> or by visiting the Planetside website at <http://www.planetside.co.uk/>

Terragen 2.5 and 3.x renders can be affordably rendered in a short time by using Planetside's official rendering partner [Pixel Plow](#).



Digital Art
LIVE



GALLERY

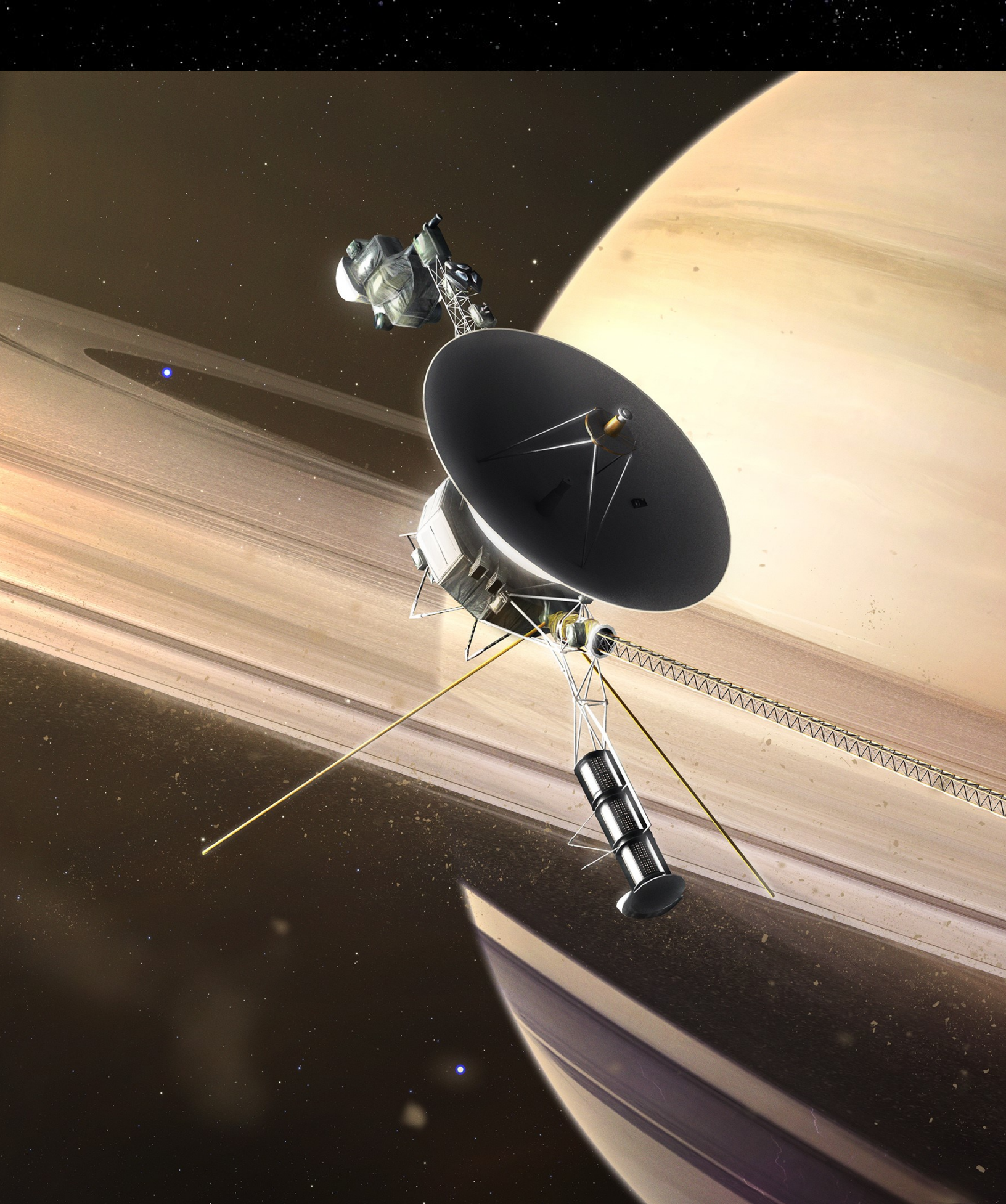


Picture: Alan Chinchar's 1991 illustration for NASA of the (then planned) future U.S. Space Station 'Freedom' in orbit. Freely adapted by Dave Haden, by darkening the picture to make it more dramatic, changing the planet and its lighting, and expanding the picture so that the station's solar panels were not clipped off.

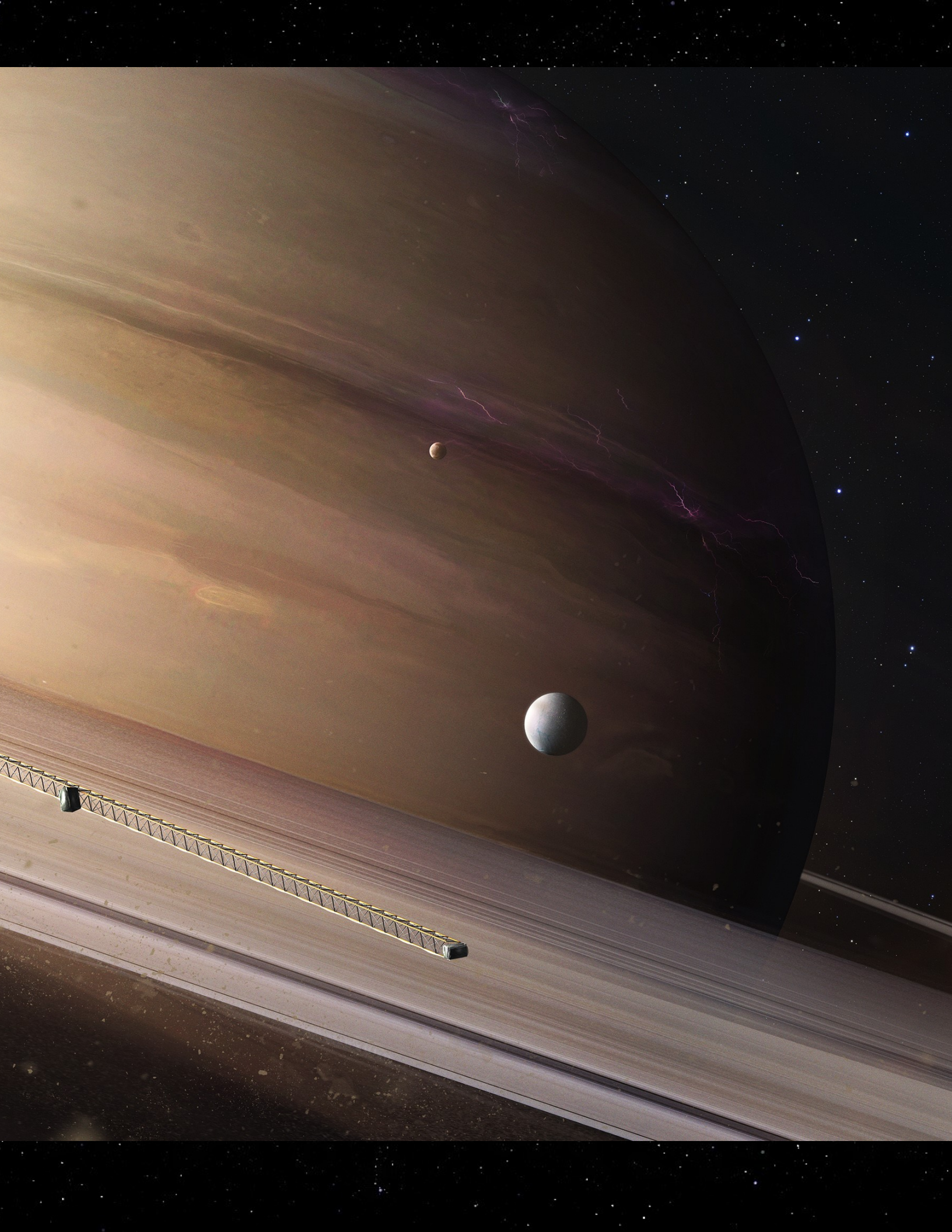
Picture: "Night Sky" by [Mohamed Xiyao](#) of the Maldives Islands.

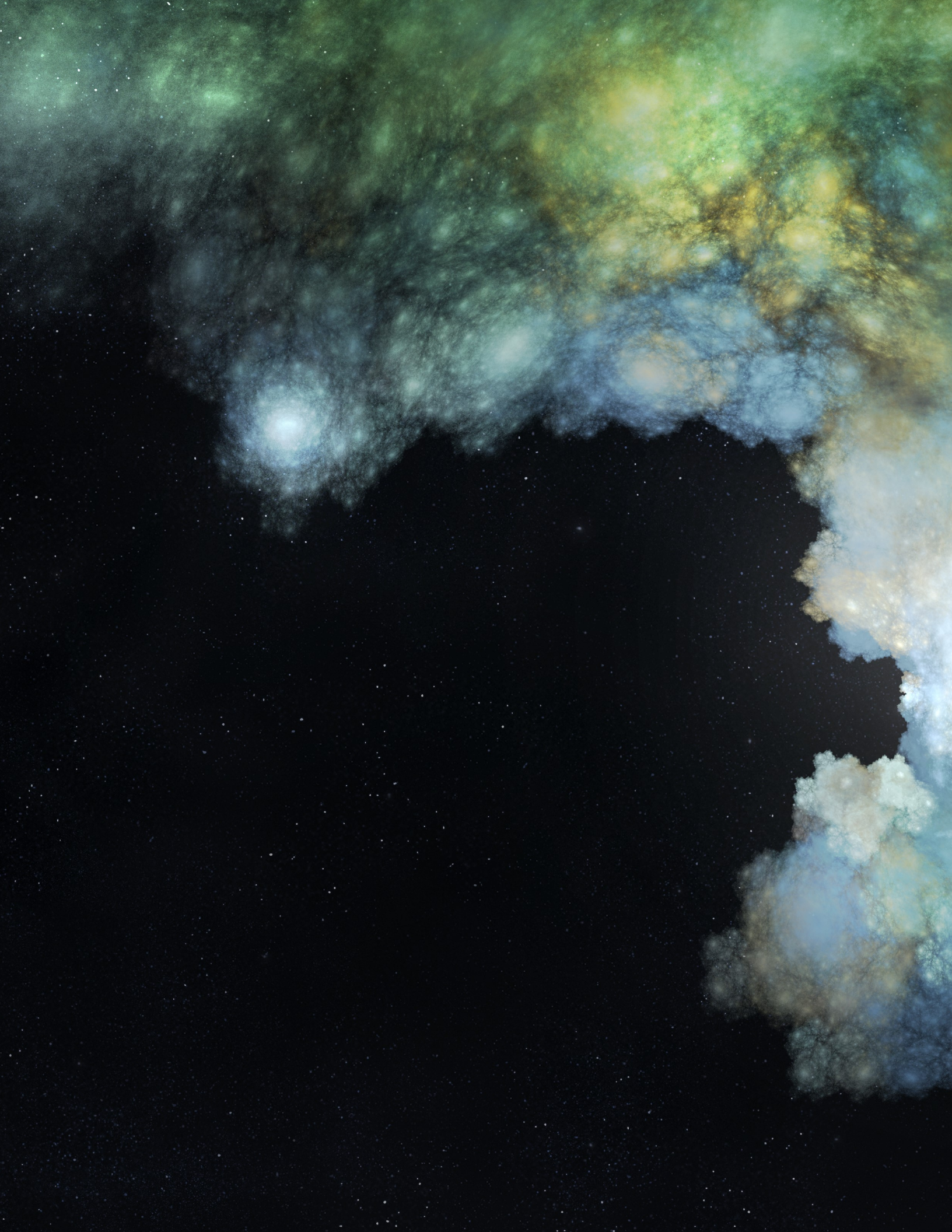


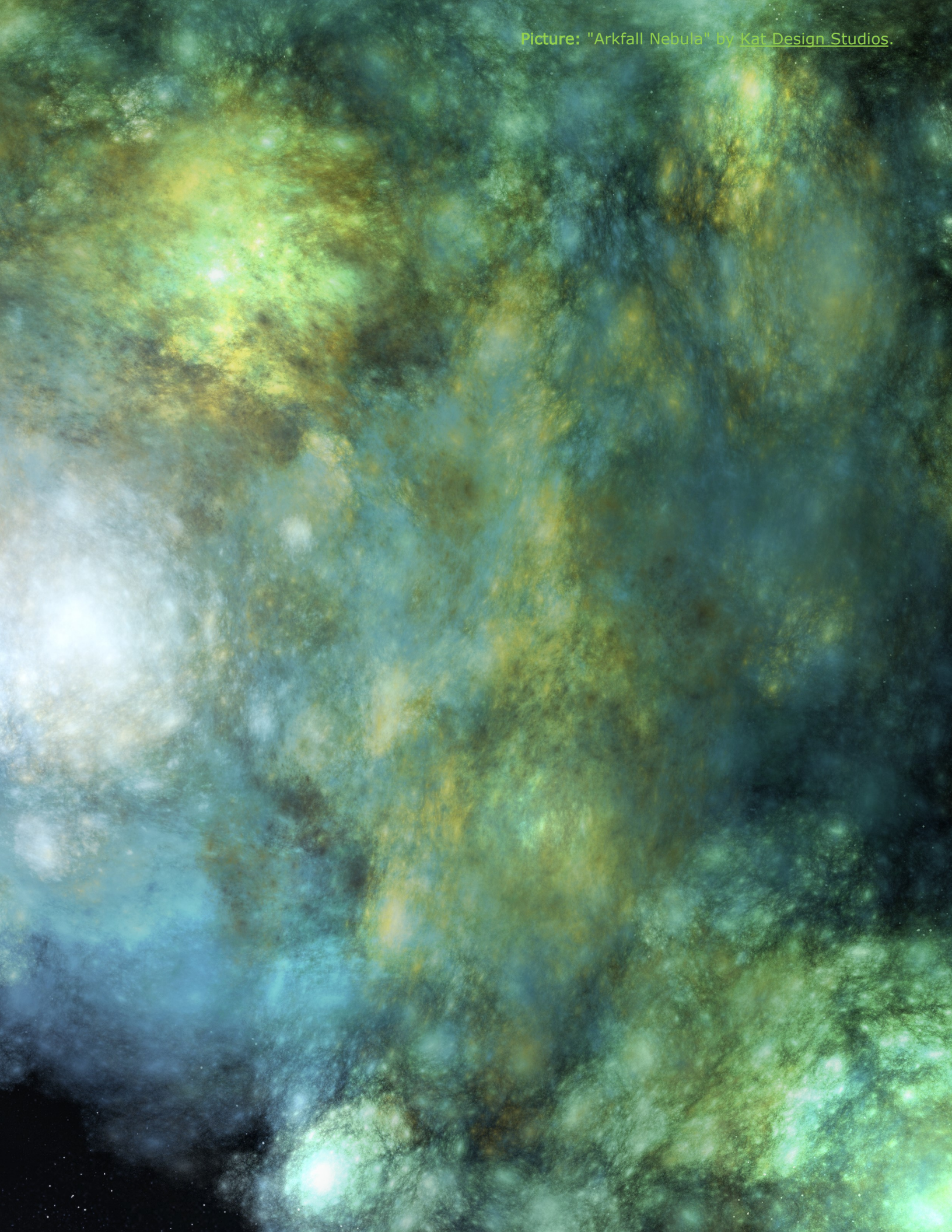




Picture: "Saturn Flyby" by Tobias Roetsch.









Picture: "Giants in the Playground—revisited" by [tk769](#).

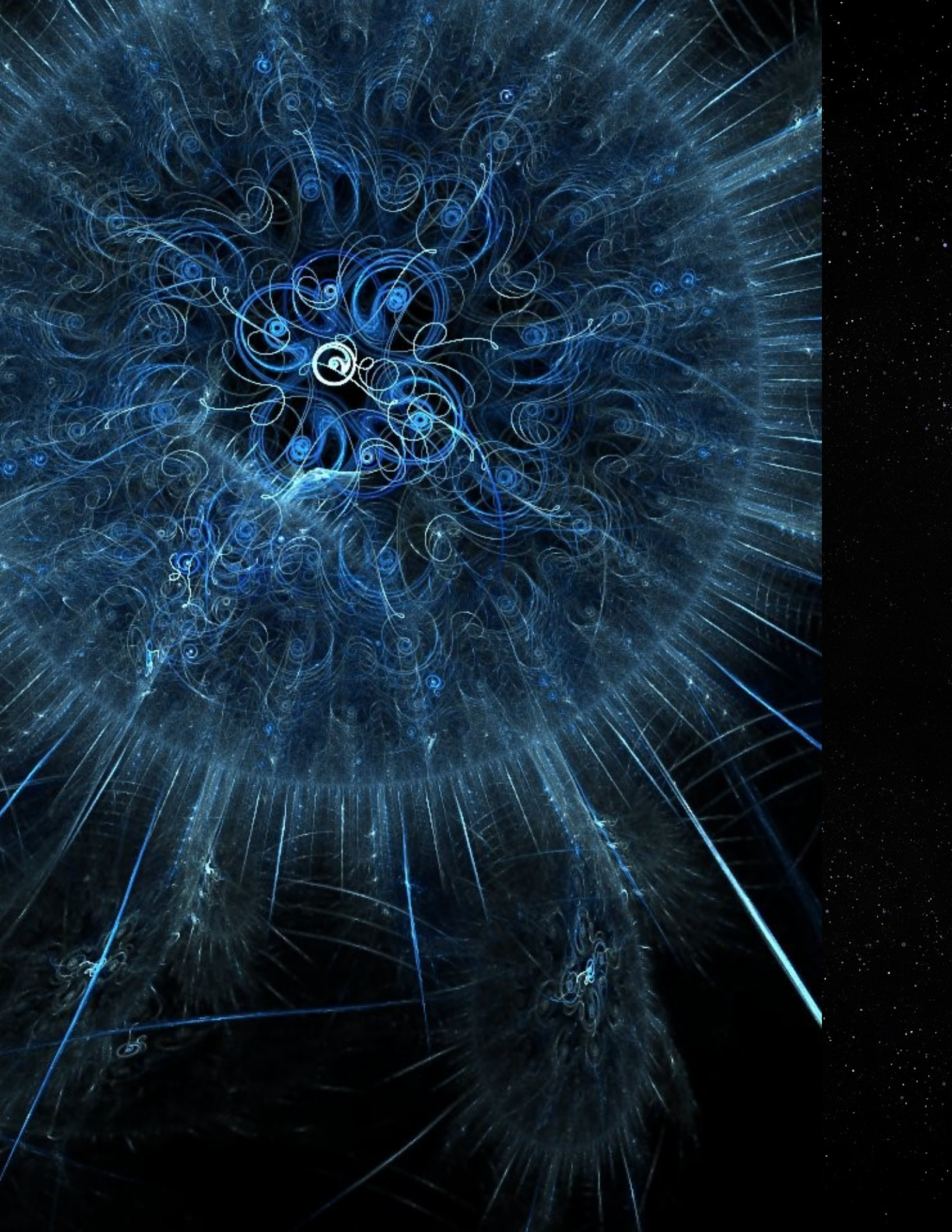


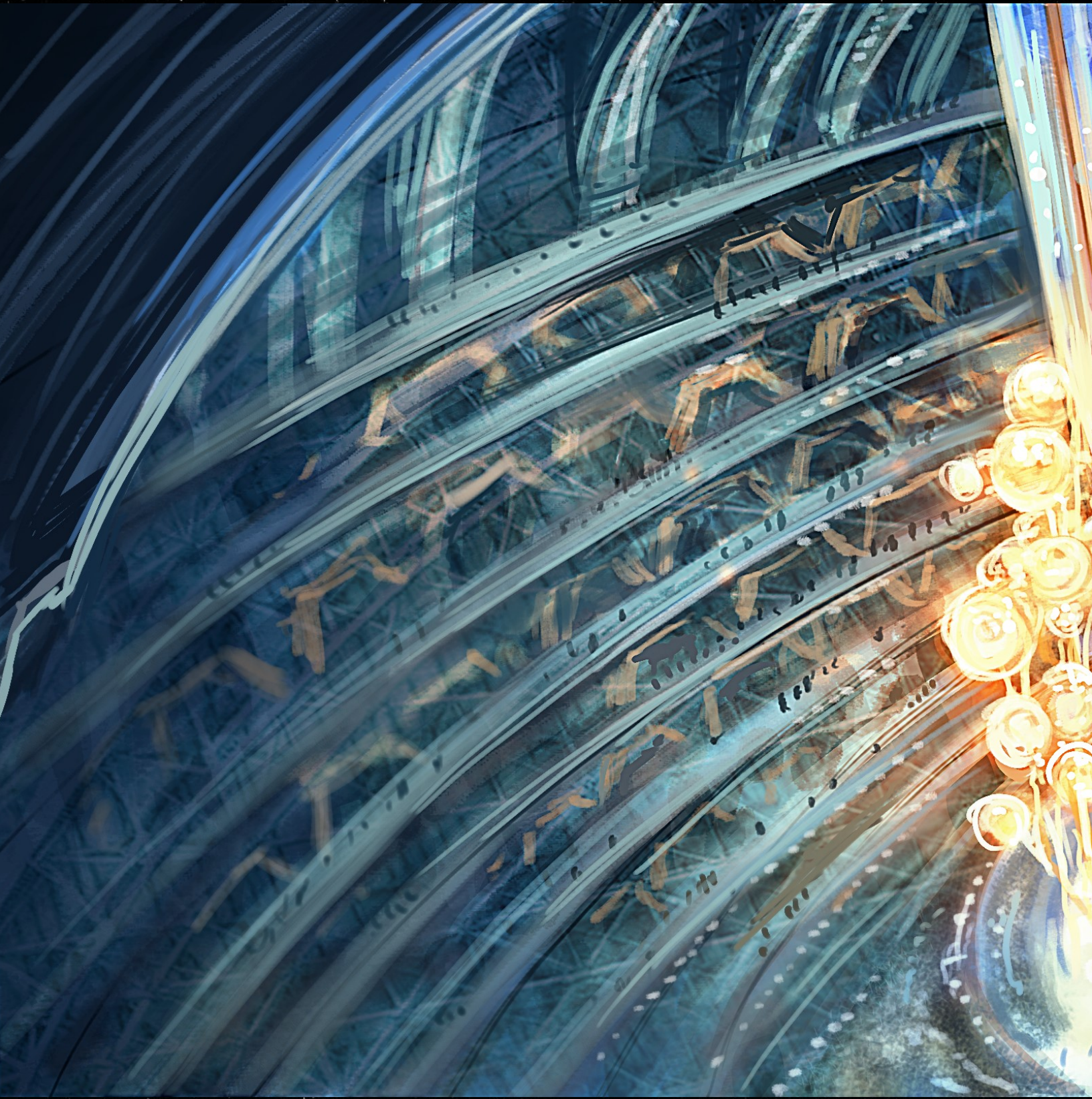


Picture: "The Watcher" by Dave Haden.

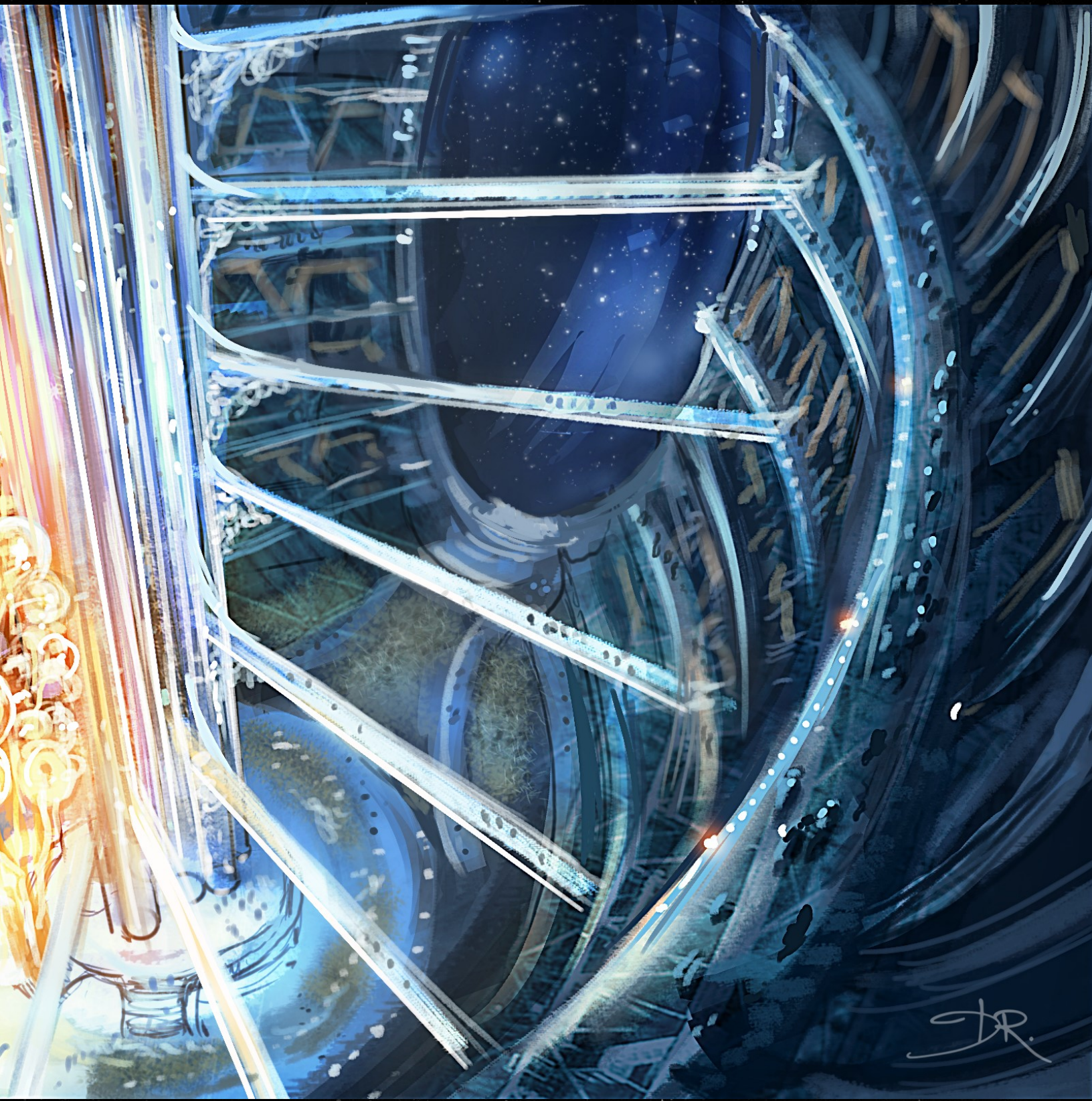
Picture: "Stellar Collision" by
Ace of the Fungal Kingdom.

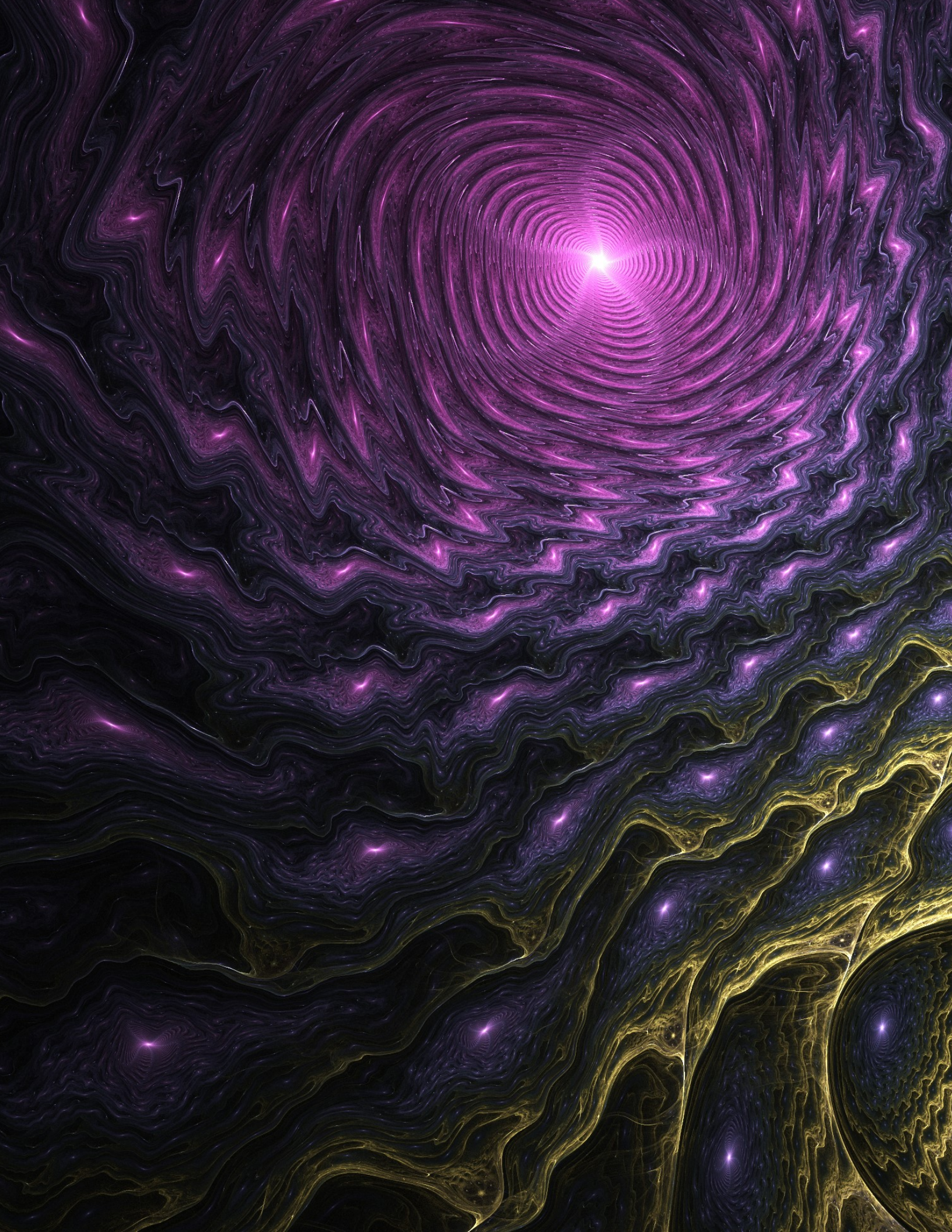




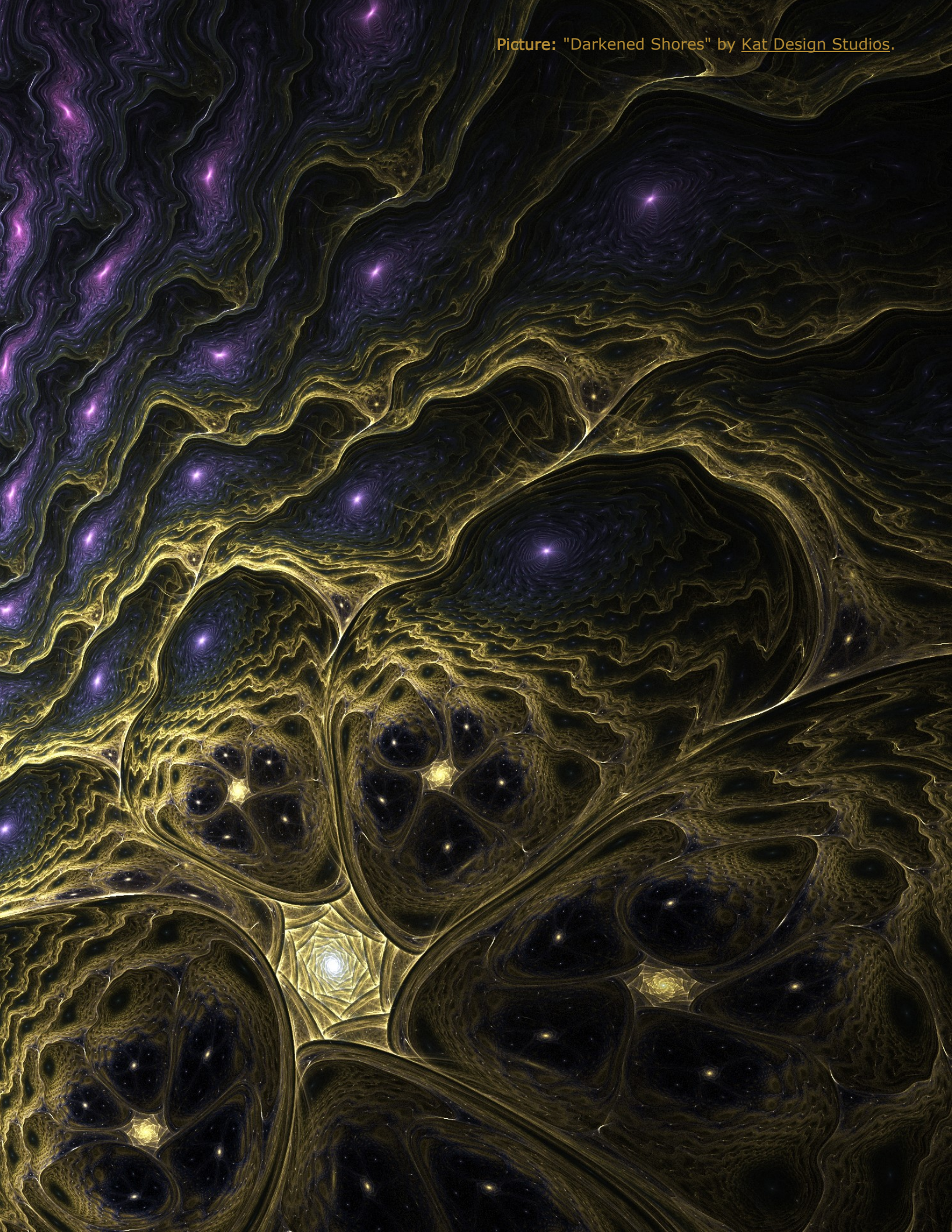


Picture: Generational starship concept illustration by David Revoy, for the Blender Foundation.





Picture: "Darkened Shores" by [Kat Design Studios](#).



His solid flesh had never been away,
For each dawn found him in his usual place,
But every night his spirit loved to race
Through gulfs and worlds remote from common day.
He had seen Yaddith, yet retained his mind,
And come back safely from the Ghooric zone,
When one still night across curved space was thrown
That beckoning piping from the voids behind.

He waked that morning as an older man,
And nothing since has looked the same to him.
Objects around float nebulous and dim—
False, phantom trifles of some vaster plan.
His folk and friends are now an alien throng
To which he struggles vainly to belong.

— H. P. Lovecraft, sonnet XXXII from *Fungi from Yuggoth*.



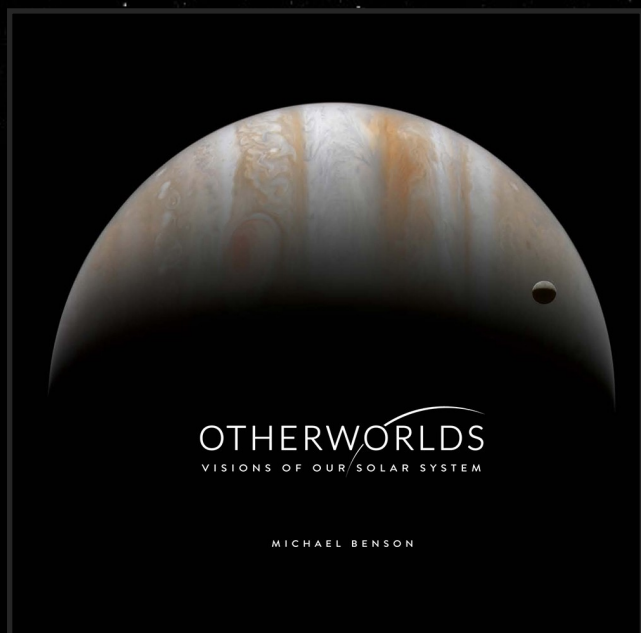
IRIS NEBULA
ALI RIES 2014



Digital Art
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IMAGIN

Our pick of the latest inspirational art and science. Make your imagination LIVE!



- Video: the Natural History Museum's Official Trailer for "Otherworlds".
- Video: The exhibition's curator Michael Benson talking about "Otherworlds".
- Video: The exhibition's curator Michael Benson talking about his favorite picture in the show.

Left: The book of "Otherworlds". The 160 page hardback is available from the Museum's website.

MICHAEL BENSON'S OTHERWORLDS VISIONS OF OUR SOLAR SYSTEM

Otherworlds: Visions of our Solar System is at the Natural History Museum in London, and runs 22nd January to 15th May 2016 (£9.90). "Otherworlds" is a major London gallery exhibition that explores the beauty of our solar system and powerfully demonstrates the visual legacy of six decades of ambitious space exploration. The show presents a visually inspiring, important and ongoing chapter in the history of photography.

On show are 73 large and newly assembled pictures from NASA and the European Space Agency, accompanied by music from ambient music composer Brian Eno and a scientific audio commentary. Also in London, over at the Science Museum until 12th March 2016, is the related space history exhibition titled **Cosmonauts: Birth of the Space Age**.

<http://www.nhm.ac.uk/visit.html>

ARIUM

Picture: Promo poster. NASA (Johns Hopkins Applied Physics Lab) / Michael Benson.

SEE THE REAL THING, WITH BINOCULARS!

What better for cosmic inspiration than... looking up at the *real* outer space! February to April often give us the crisp and clear night sky needed for evening stargazing. To enjoy such a night sky we strongly recommend avoiding the purchase of a cheap toy-shop telescope, which will be tricky to set up and steer. Invest instead in a solid and strong pair of binoculars.

- **Strathspey Marine 7x50**, £120 (right) are made in the UK with high-quality components and are highly recommended by the BBC *Sky at Night* magazine. These heavyweight binoculars come complete with a tripod bracket. Perfect if you already have a good standard camera tripod, and it means that you can fix a view that small kids and older relatives can then easily view. Several magazine reviews state that these give an outstanding clarity, a wide field of view, and a crisp focus across the whole of the lens view.

- If you need a cheaper 10x50 pair of hand-held binoculars, then the related **Strathspey Marine 10x50** waterproof brand regularly wins many magazine group tests of binoculars in the £50 range. The Strathspey range isn't on Amazon, and can be ordered from the manufacturer.



What does the 'x' mean?

When buying binoculars, the x means 'times'. So 10x50 means the binoculars will give a magnification of 10 times your normal sight, and that they use 50mm lenses at the front to suck in their light.

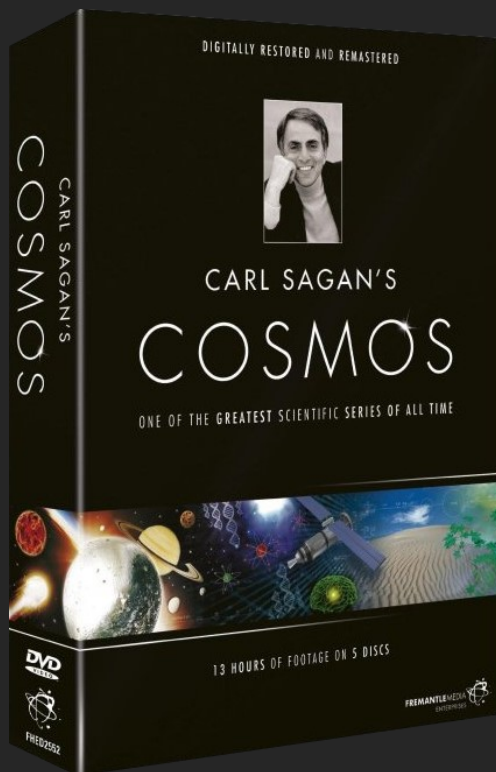
As magnification goes up, the brightness of the image goes down — so light-polluted skies don't work well with big lenses.



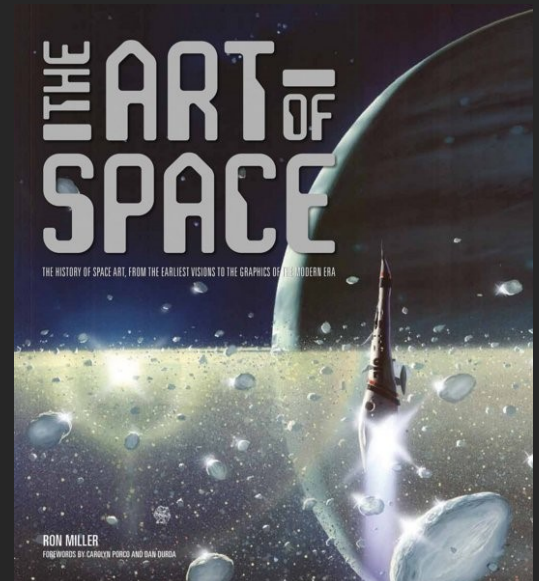
- On Amazon UK the **Olympus Binocular 10x50 DPS-1** (above) is currently the top long-term seller at the £50 mark (\$70). Keep in mind that a tripod mount for them will set you back a further £10, though the budget price does include a case and lens caps.



- The **Celestron Cometron 7x50** (above) are optimised for the night sky, and at just \$35 on Amazon USA they are suitable for younger children. Despite their cheap price, they took the second place "Runner-Up" in Space.com's 2015 survey of small astronomical binoculars.



Once you're back in the warm with a mug of cocoa, the classic inspiration is of course the famous Carl Sagan TV series *Cosmos*. Now available on a DVD set at a budget price.



If you only need to own one space art book, it should be 2014's *The Art of Space* from Zenith's Press. The history of space art presented in 350 oversize pictures, many as double-page spreads. Solid historical research, and an outstanding selection of pictures. There's also a section on aliens.



- Of course, it is possible to go overboard, with hi-tech image stabilisation, built-in cameras, and uber-buttons. All that doesn't come cheap, though. Expect to pay a whopping £2,300 for the **Canon 10x42L** (above). Highly recommended by *Wired* magazine in their 2015 survey of high-tech binoculars.

There is a wealth of online help and advice available to amateur astronomers. Though it's easy to get bamboozled by the 'scope-snobs, maths and high-end kit.

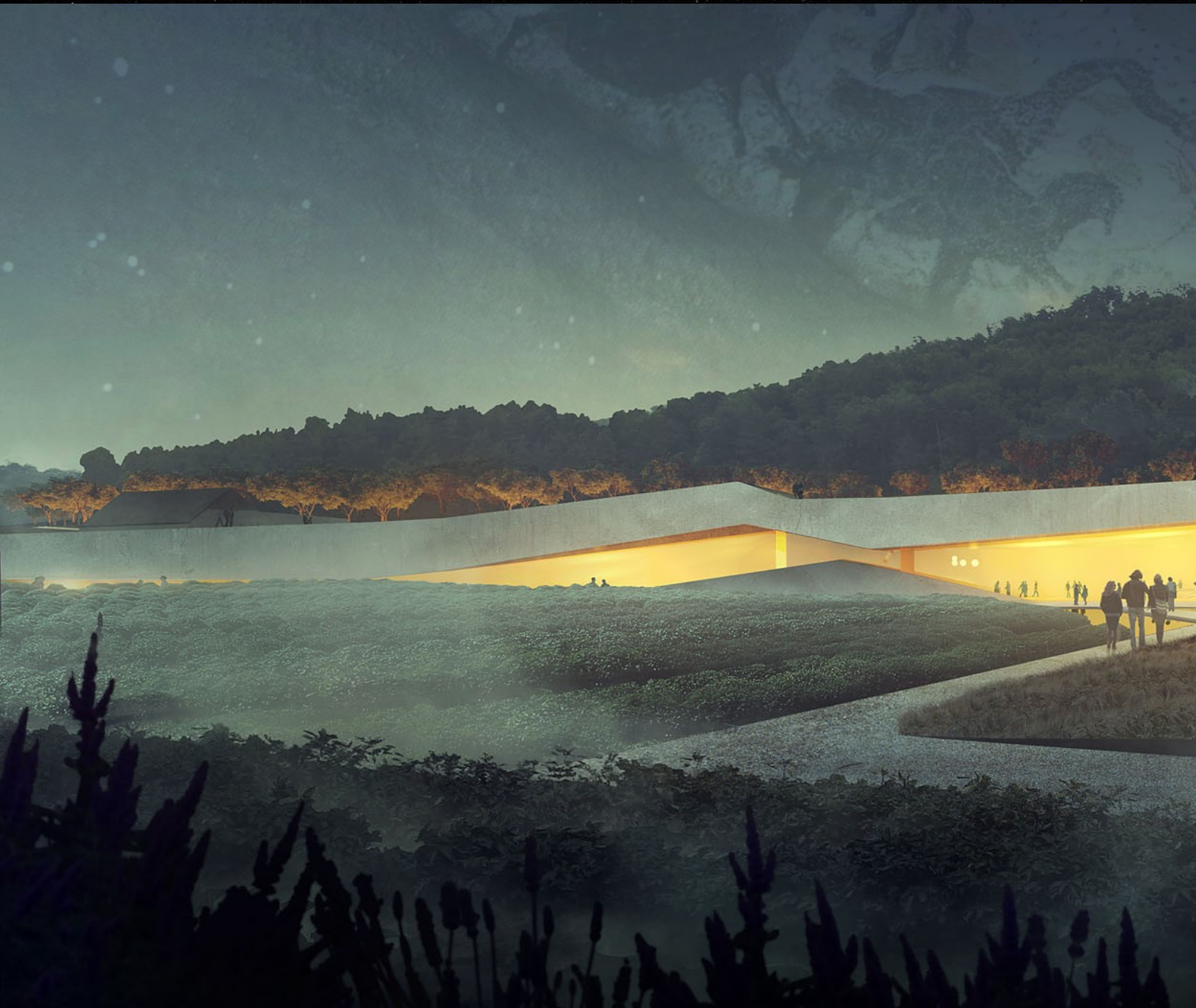
A useful starting point in the UK is the famous Jodrell Bank Observatory's free monthly **'The Night Sky' email newsletter**. This simple newsletter tells you what to look out for, and it contains a simplified star map of the sky for the month — rather like the sort of sky map that once used to be seen printed each month in the back of quality newspapers. Accurate, but you won't get lost in complexity.

Also worth getting to know is the excellent and friendly weekly U.S. podcast **AstronomyCast**, part-funded by NASA from 2016 on.

LASCAUX 4

Artists have made a perfect life-sized replica of the Lascaux caves, the walls and roofs of which famously depict a constellation of animals — perhaps our Stone Age ancestors' conception of the night sky and its mythic animal constellations. The replica cave walls are now being transported to the International Centre of Parital Art, 300 miles southwest of Paris. The new \$75m museum will open at the end of 2016, innovatively showing this most ancient of art amid a futuristic science-fiction architecture.

Lascaux was discovered in 1940 by four boys and a dog named Robot. One summer morning they went on a boyish quest to find their village's legendary lost 'treasure tunnel'. Amid the roots of a newly fallen tree they found the opening to a long vertical shaft. Venturing down, they discovered a vast cave with 2,000 animal pictures sealed away from the world for 17,000 years. Closed to the public since 1963, Lascaux is one of the world's the most important collections of prehistoric art.





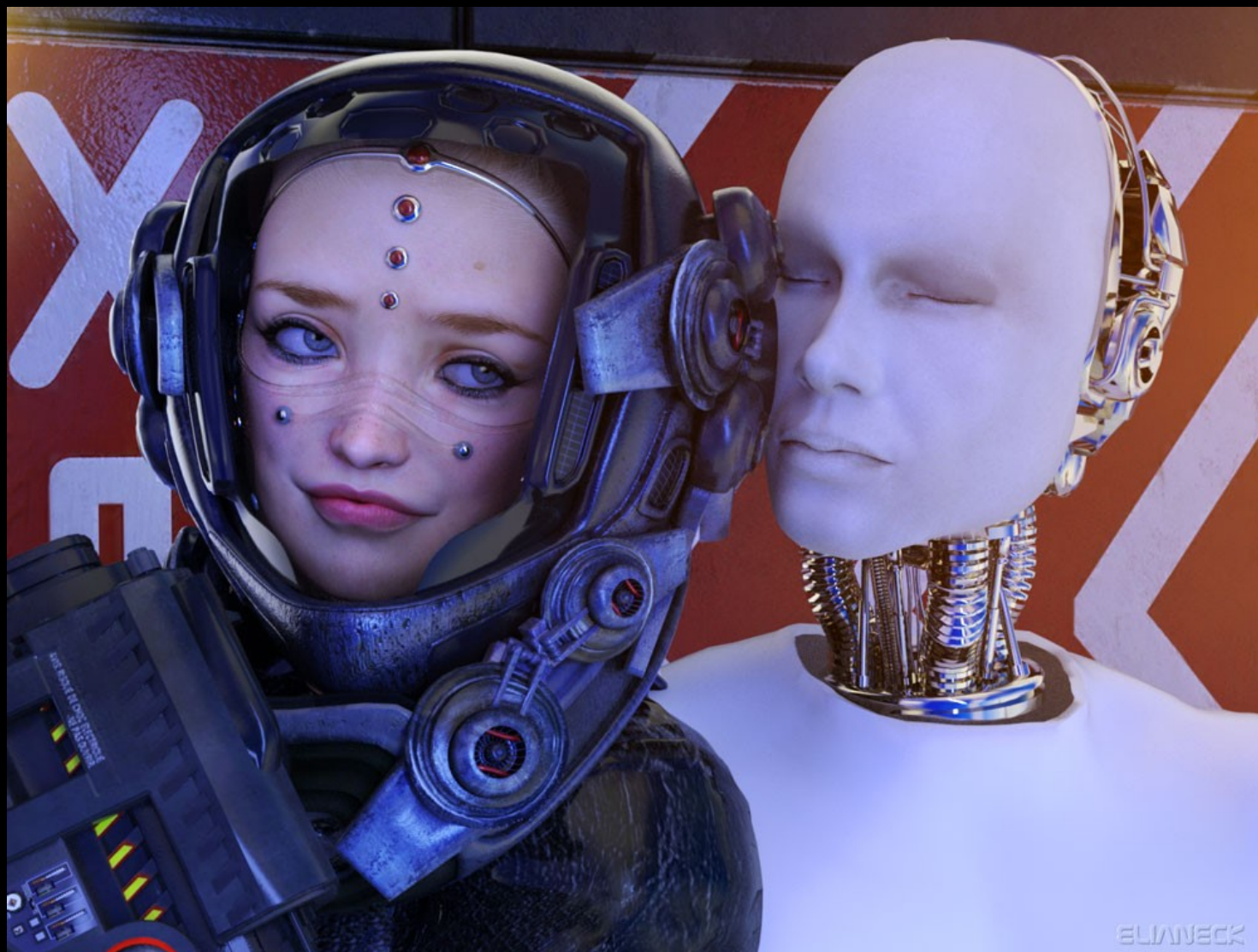
LASCAUX⁴



Interested in being interviewed in a future issue of *Digital Art LIVE* magazine? Or offering a webinar for our conference series? Please send us the Web address of your sci-fi gallery or store, and we'll visit!

paul@digitalartlive.com

Back cover:
"smelling" by
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'BOTS and 'BORGS