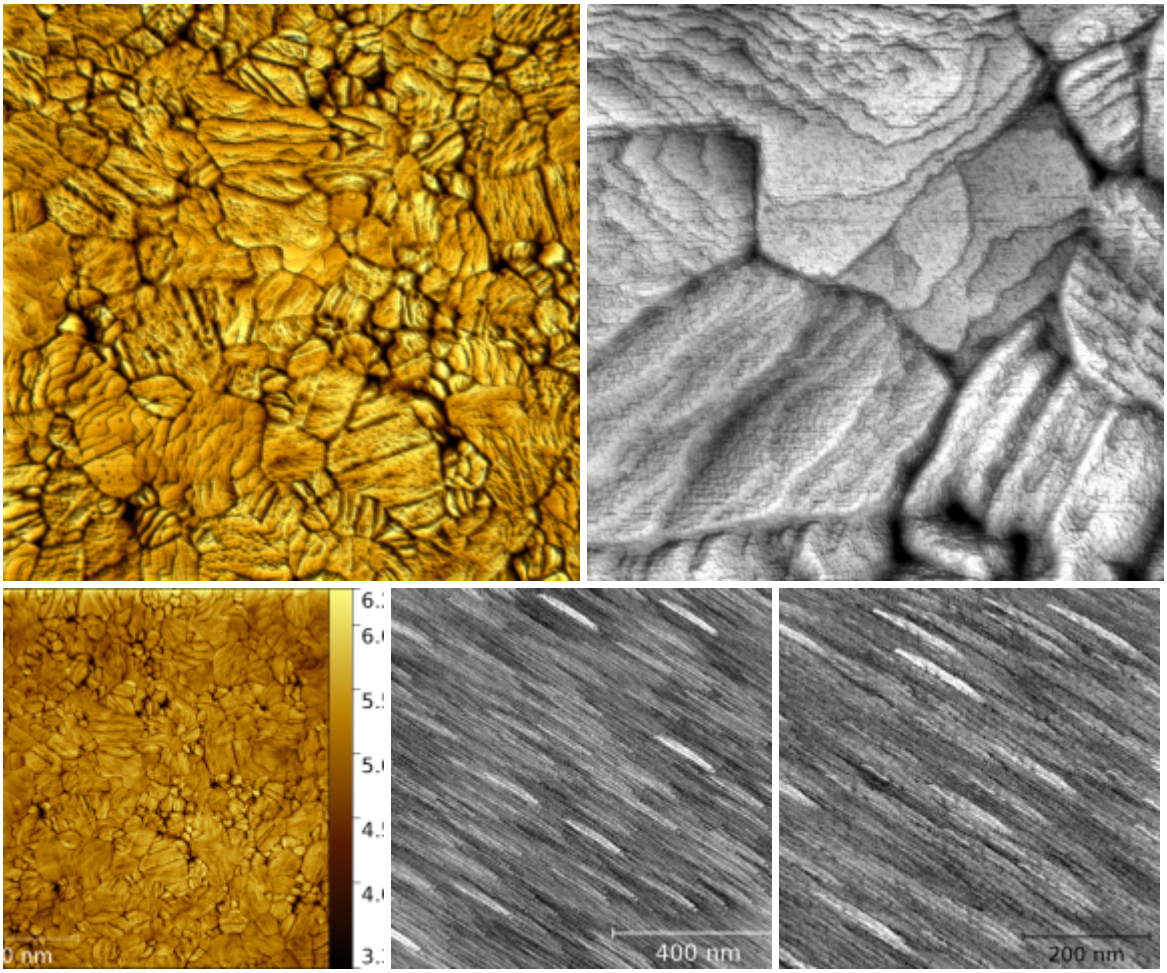
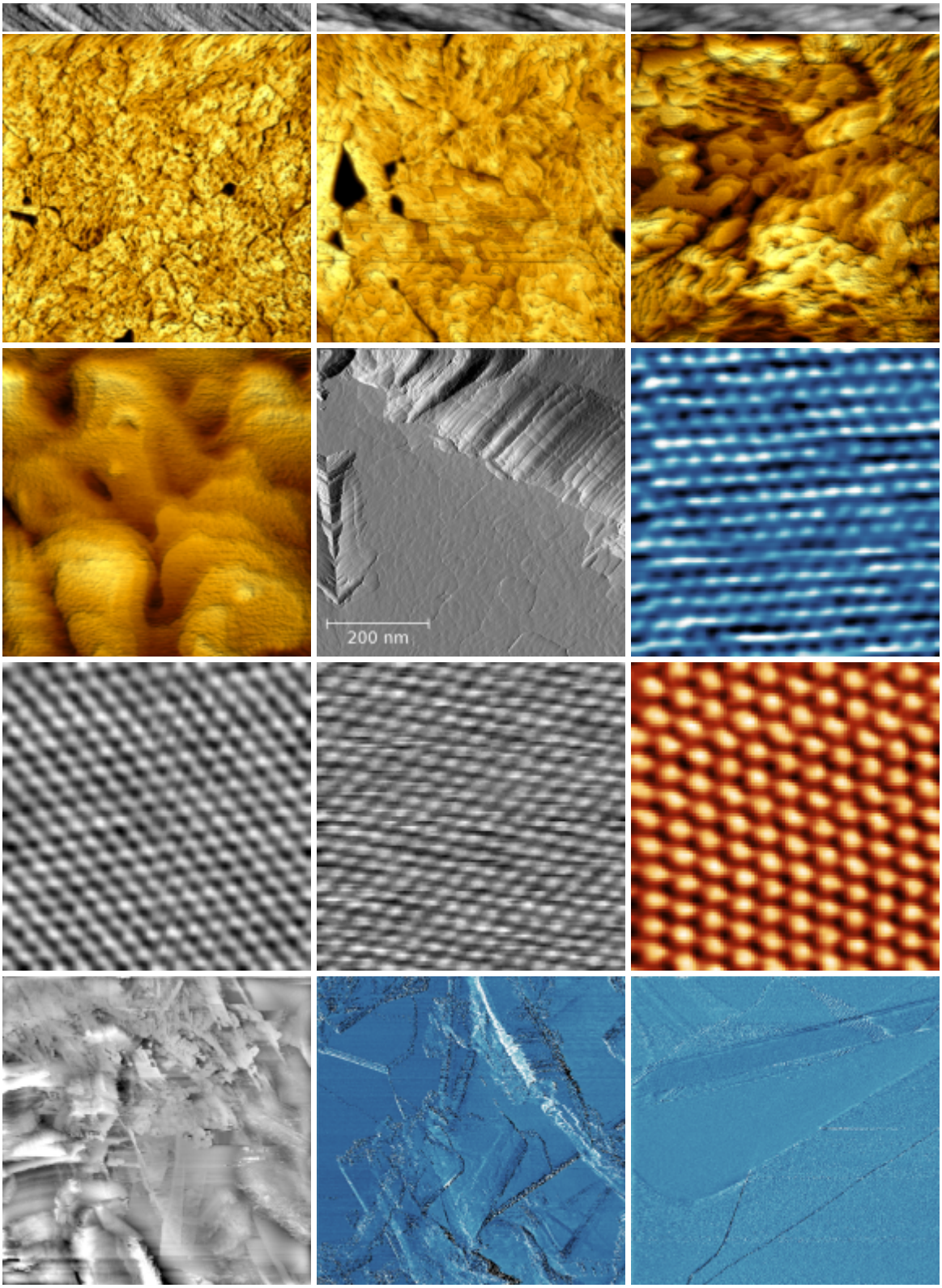
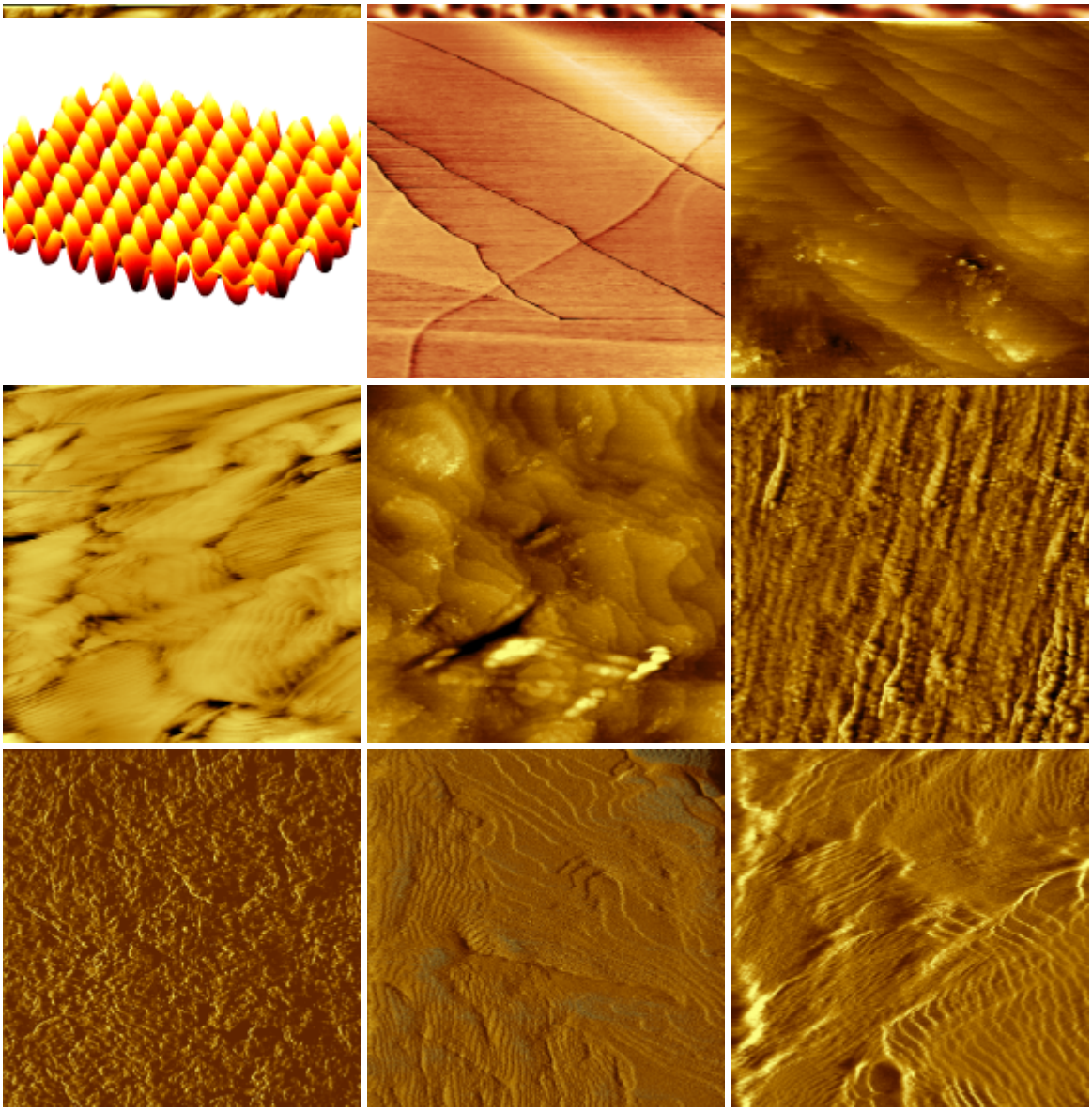
Dan Berard







18 THOUGHTS ON “IMAGE GALLERY”

Chris Bellia
on **September 30, 2019 at 11:00 am** said:

This is great work, can there be some sort of scaled parallax effect in two scans to create the translation into a 3D Stereo image pair , so the complete structure can be manipulated and viewed with an Oculus Quest untethered Virtual Reality headset?
The images could be applied as a normal map texture onto a 3D geometric object for

the pseudo parallax need to create the stereoscopic view, it would have to be normalized like a version of stereoscopic macro insect phot0graphy but on steroids.

Once a large enough of materials were studied, I would think a 3D virtual reality nanoCAD design package could be created with dimensional at that level.

★ Like

nargot
on **November 1, 2016 at 6:10 pm** said:

why not just flood a chamber with nitrogen gas instead UVH ?

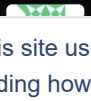
★ Like

Dan Berard
on **November 1, 2016 at 10:24 pm** said:

Good question! The problem is that the oxygen concentration in the chamber really does need to be extremely small. The nitrogen would have to be so pure that the density of oxygen contaminant is less than the oxygen density in air pumped down to UHV. At atmospheric pressure, there are about 10^25 molecules/m^3. At UHV, this drops to about 10^13 molecules/m^3. This means you'd need nitrogen that's around 99.9999999999% pure! I'd imagine that trying to flush out/purge all the air from the chamber would also be extremely difficult.
-Dan

★ Like

Pingback: A home-built scanning tunneling microscope with atomic resolution | Dan Berard



Don’t accidentally split one of those

★ Like

bioh4k3r
on **January 14, 2015 at 6:08 pm** said:

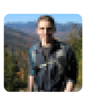
You are my new Hero man!!!
INCREDIBLE GOOD JOOB!!!!!

★ Like

Sympa
on **January 14, 2015 at 3:40 pm** said:

Would silicon be a suitable material to scan? Computer chips probably need some ethcing away of the passivation layer though.

★ Like



Dan Berard
on **January 14, 2015 at 5:20 pm** said:

Silicon oxidizes very rapidly in air, so it can only be STM’ed in UHV.

★ Like

make a High Vacuum Chamber to inspect samples that readily oxidize? if not, what are some off the top of your head ideas one should look at before beginning on a design concept. can you readily identify any of your components that would fail under vacuum? I see one area of caution in; The adhesives being used cannot contain ensonified gasses. (solution: perhaps curing under vacuum?)

★ Like

Dan Berard
on **June 21, 2016 at 6:40 pm** said:

The trouble is, high vacuum isn't good enough, it really needs to be ultra-high vacuum. There's an excellent explanation of why that is here: http://faculty.virginia.edu/harrison/STM/tutorials/UHV.html
Higher vacuum levels reduce the time it takes for a surface to oxidize by reducing the number of gas molecules colliding with the surface. In high vacuum, a surface like silicon will still oxidize in a matter of seconds. In UHV, it will last much longer.
UHV typically requires at least 3 pumps: a roughing pump, high vacuum pump (like a turbopump or diffusion pump), and a UHV pump (like an ion pump). Pumping to UHV can be very time consuming, which makes tip and sample changes much more complicated.
As for adhesives, the ones I used (e.g. super glue) aren't UHV compatible, but there are epoxies available that are. I've never worked with UHV before so I'm no expert on this stuff.

★ Like

Dan Berard
on **June 21, 2016 at 6:44 pm** said:

On the other hand, if you just wanted to obtain low temperatures (e.g. LN2 cooling) and didn't care about oxidation, then UHV probably isn't needed. In that case, you'd just need some level of vacuum for thermal insulation and

Tetsuo Hanaguri
on **January 14, 2015 at 11:41 am** said:

The most impressive STM data I've seen in last 10 years!!

★ Like

nixieguy
on **January 13, 2015 at 4:00 pm** said:

So awesome!
Will you be able to flip out atoms from the lattice, aplying a higher voltage spike? I bet that if you can and draw HaD logo…you will be an epic win of the decade. XD

★ Like

Dan Berard
on **January 13, 2015 at 5:37 pm** said:

Good idea! I'll definitely try to figure out a way to draw patterns on the surface! Might not work with graphite though, since all the atoms on the top layer are covalently bonded to each other, but it's worth a try.

★ Like

Here from HAD – one suggestion to damp out high frequency vibration is simply … an inner tube. We've done some holography work (very vibration sensitive) using high mass steel plates and placing them on small inner tubes. Gets rid of all but the very low frequency stuff.

★ Like

Dan Berard
on **January 13, 2015 at 3:30 pm** said:

Thanks for the suggestion, I've heard of that approach being used for STMs before. If I can find a big enough steel plate I'll give that a try!

★ Like

Jan Henrik
on **January 13, 2015 at 1:00 pm** said:

Dude, that project is awesome, will/do you provide a pcb layout? 🙂

★ Like

Dan Berard
on **January 13, 2015 at 1:40 pm** said:

Working on it! I'm planning for it to have digitally controlled gain and automatic coarse approach with a stepper motor.

★ Like