



2014 EIPBN MicroGraph Contest



The Innovation of Precision

20th EIPBN MicroGraph Contest

*A Good Micrograph is Worth the
Megabyte it Consumes*



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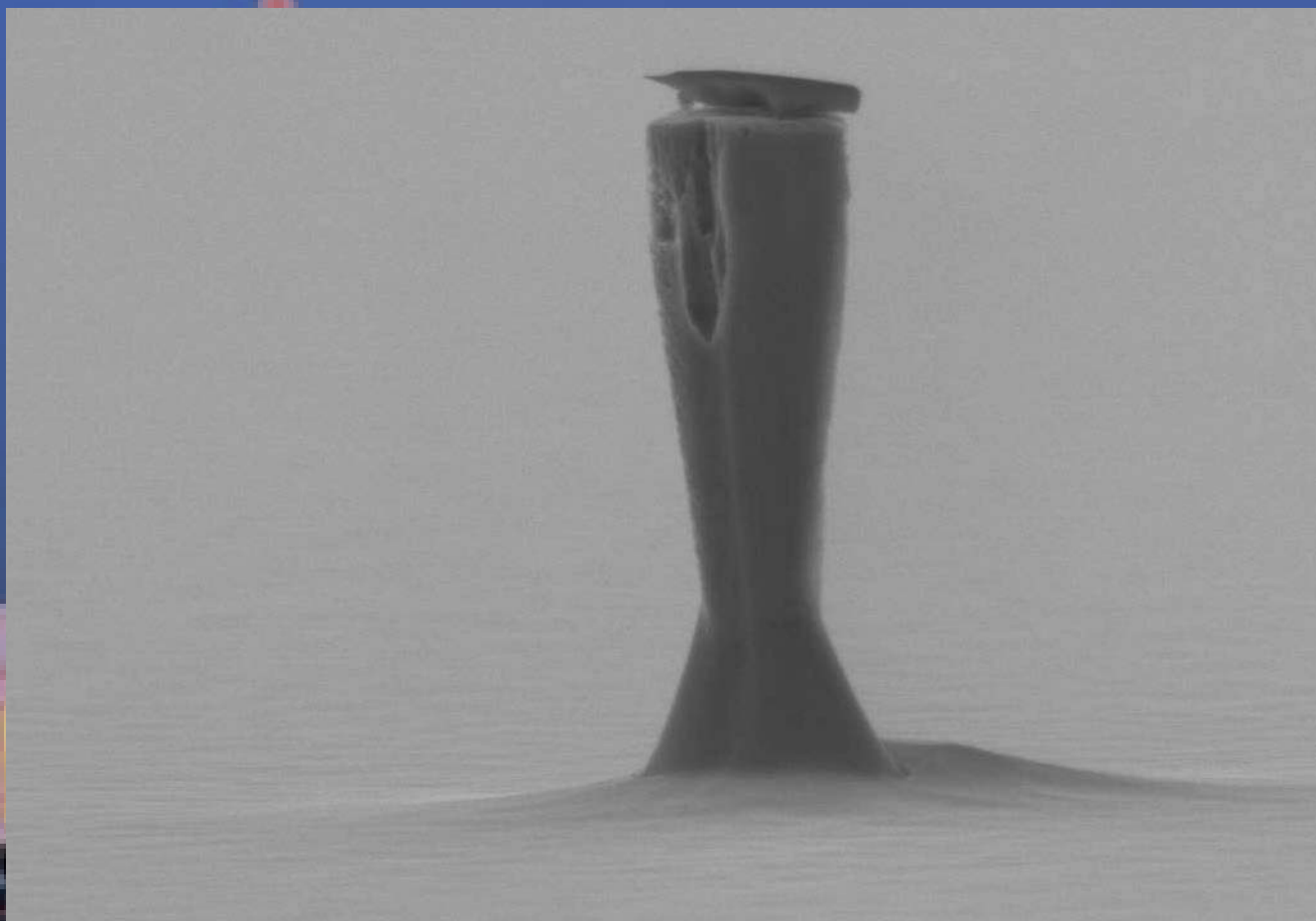


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Desert Butte

Description:
InP after Cl₂ plasma etching . A particle on surface acted as a mask, creating this mesa



Magnification (3"x4" image): 8KX
Submitted by: Pat Watson

Instrument : Philips XL30 SEM
Affiliation: Princeton University

EIPBN

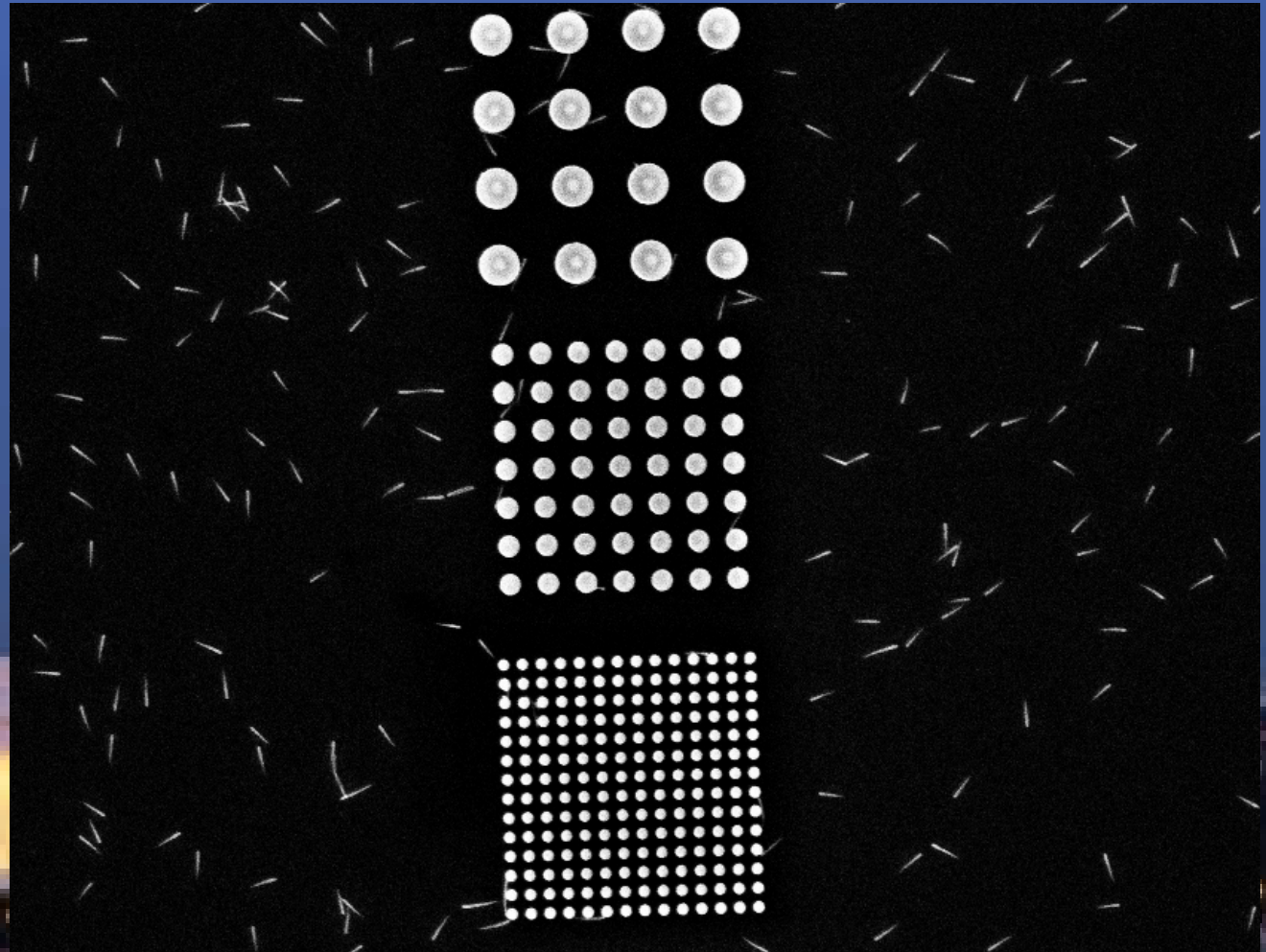


2014 EIPBN MicroGraph Contest

Micrograph Title:
Nano-fertilization

Description:

Exposure of square array of HSQ dots with 75nm, 150nm, 300nm diameters and production of nano-flakes over the substrate due to low-dose exposure of some external strictures produces a patterns which gives an impression the fertilization process (nano-flakes can be perceived as sperms and dots as eggs)



Magnification (3"x4" image): 33.63KX

Instrument : Zeiss Supra VP55

**Submitted by: Waiz Karim
Institute, Switzerland**

Affiliation: ETH Zurich and Paul Scherrer

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Micrograph Title:
Micro-spring(1)

Description:
A spring-like
structure formed by
an aligned bundle of
carbon nanotubes

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Magnification (3"x4" image): 1.55KX **Instrument : Zeiss Sigma VP**
Submitted by: Mike Chang, Alireza Nojeh
Affiliation: ECE, UBC

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Micrograph Title:
Micro-spring(2)

Description:
A spring-like
structure formed by
an aligned bundle of
carbon nanotubes

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Magnification (3"x4" image): 3.74 KX
Submitted by: Mike Chang, Alireza Nojeh
Affiliation: ECE, UBC

Instrument : Zeiss Sigma VP

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Micrograph Title:
Micro-spring(3)

Description:
A spring-like
structure formed by
an aligned bundle of
carbon nanotubes



Magnification (3"x4" image): 6.23 KX
Submitted by: Mike Chang, Alireza Nojeh
Affiliation: ECE, UBC

Instrument : Zeiss Sigma VP

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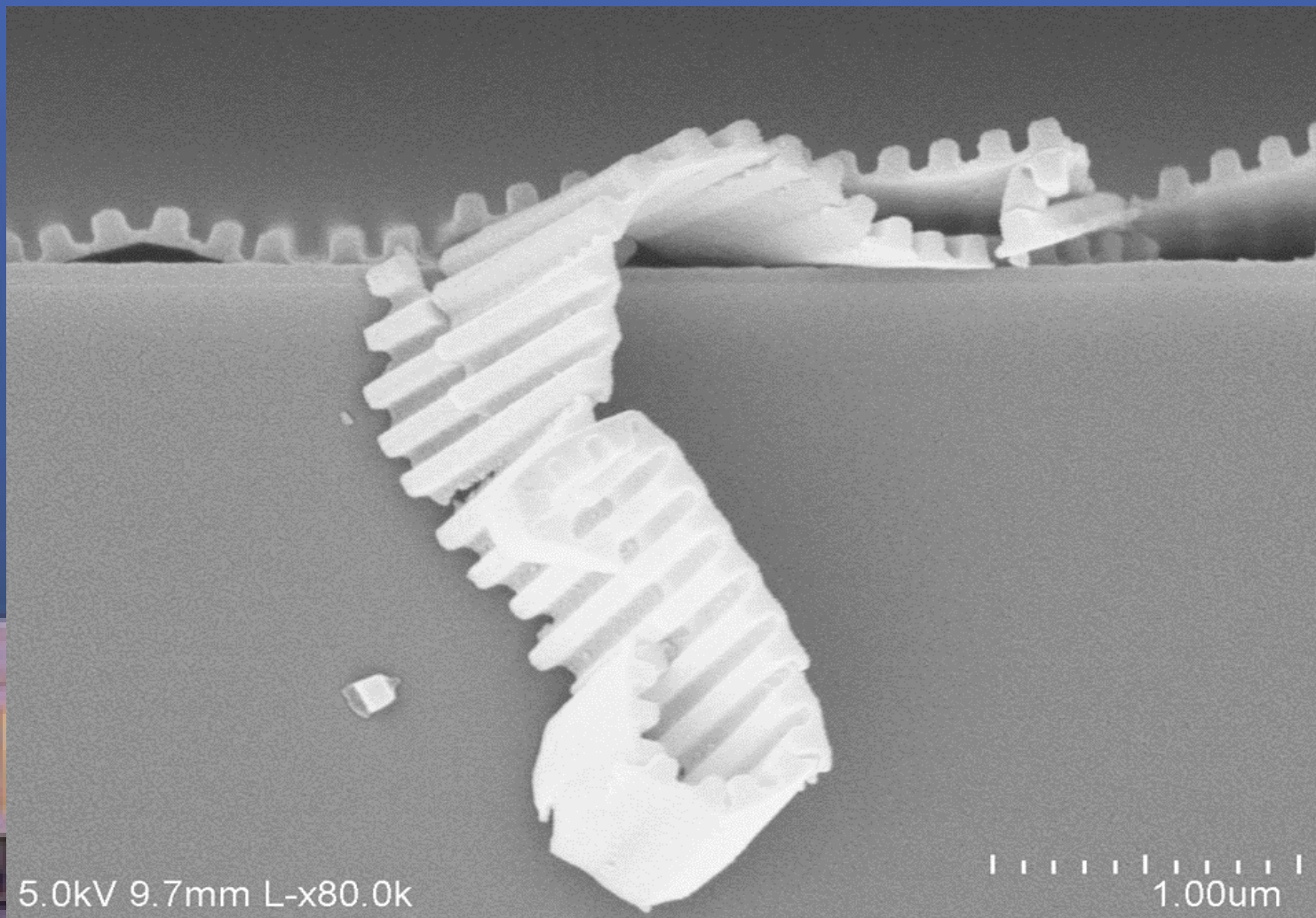
Micrograph Title:

Broken Rails

Description:

Nano-scale polymer gratings naturally fall into “broken rails” after being cleaved.

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Magnification (3"x4" image): 80 KX
Submitted by: Cheng Zhang

Instrument : Hitachi SU8000
Affiliation: University of Michigan

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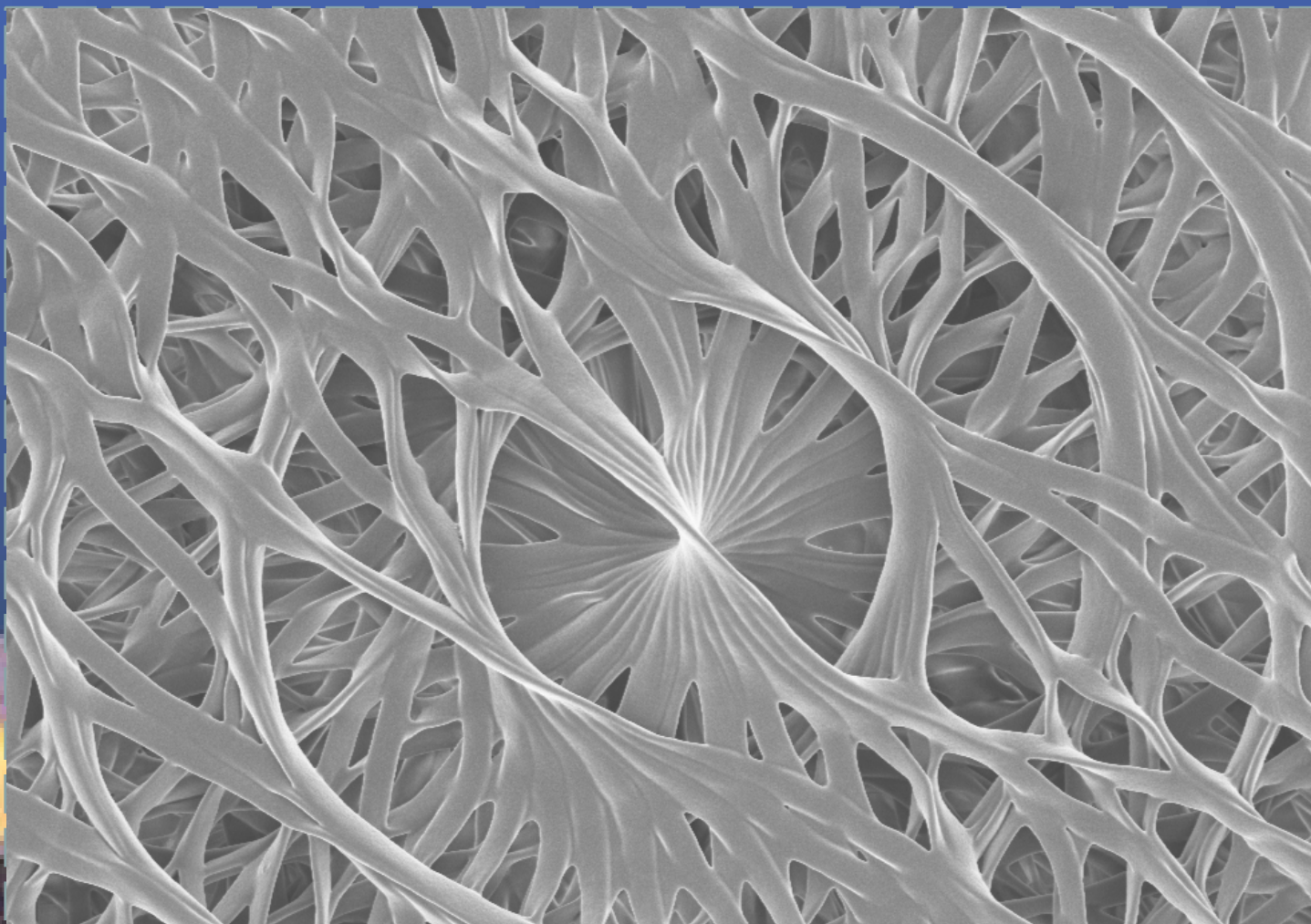


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THE SWIRL

Underdosed hatch-
ing structures in 2-
photon polymeri-
zation undergone
shrinkage and
collapse

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Magnification (3"x4" image): 15KX

Submitted by: Robert Kirchner

Instrument : ZEISS Supra 55 VP

Affiliation: Paul Scherrer Institut
Switzerland

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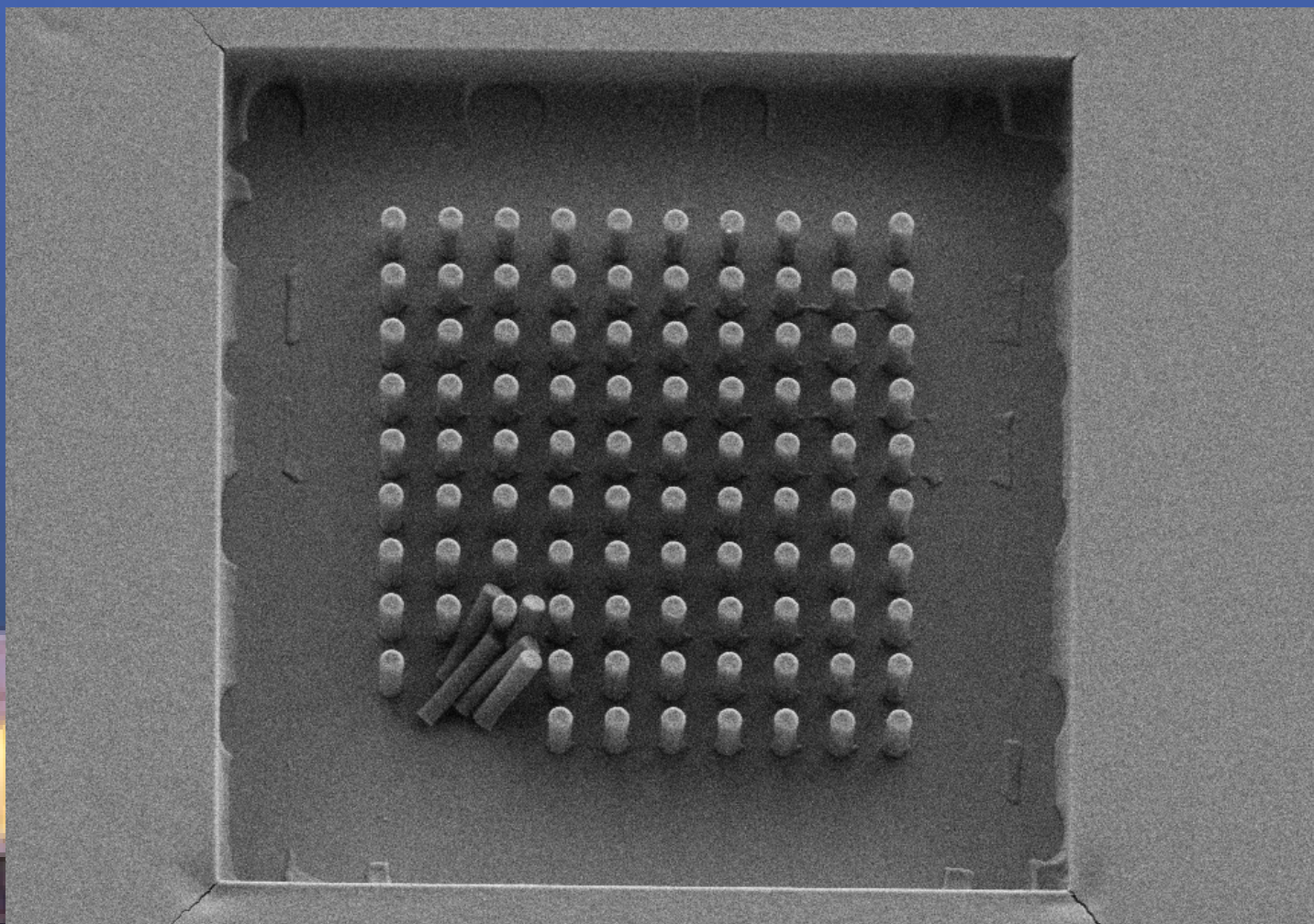


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HOLD FAST

**300 nm PMMA
pillars detached
after development
(e-beam lithogr.)**

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Magnification (3"x4" image): 15.6KX

Submitted by: Robert Kirchner

Instrument : ZEISS Supra 55 VP

**Affiliation: Paul Scherrer Institut
Switzerland**

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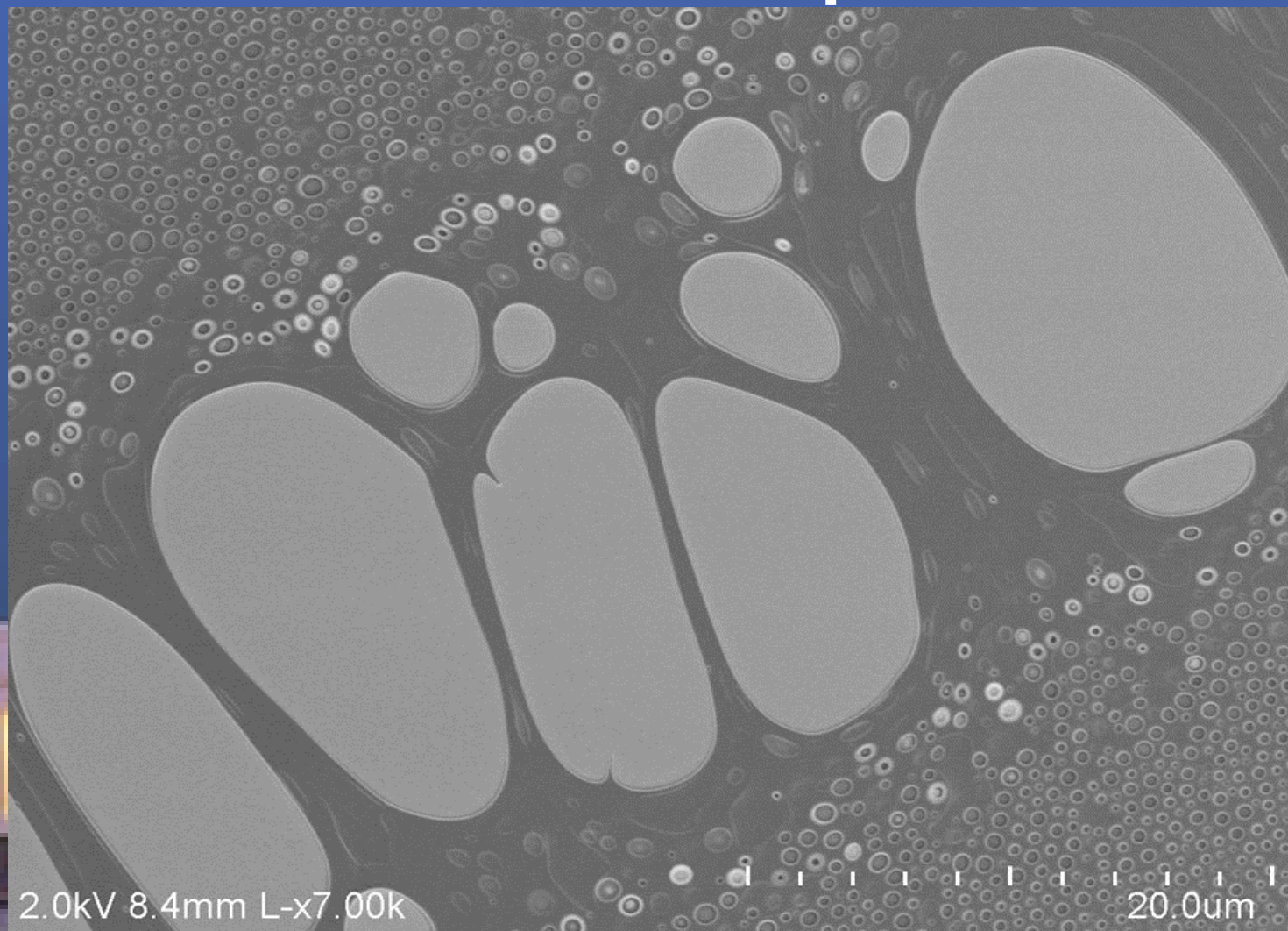
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Micrograph Title:

Big vs Small

Description:

When the spun-coat film looks ugly macroscopically, it might be fascinating microscopically.



Magnification (3"x4" image): 7KX

Submitted by: Cheng Zhang

Instrument : Hitachi SU8000

Affiliation: University of Michigan

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Micrograph Title:

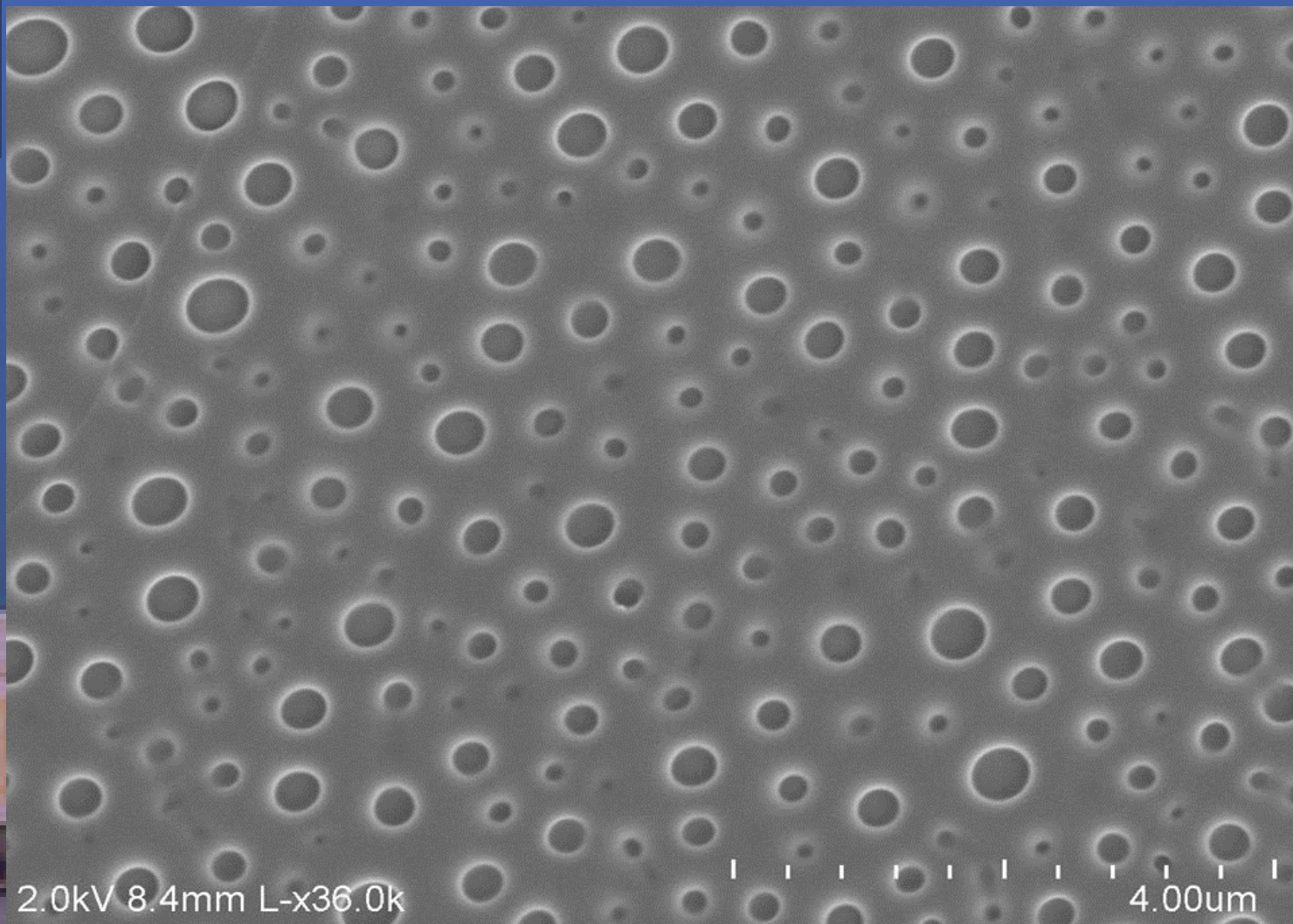
**Boiling Water
Bubbles**

Description:

When the spun-coat
film looks ugly
macroscopically, it
might be fascinating
microscopically.



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Magnification (3"x4" image): 36KX
Submitted by: Cheng Zhang

Instrument : Hitachi SU8000
Affiliation: University of Michigan

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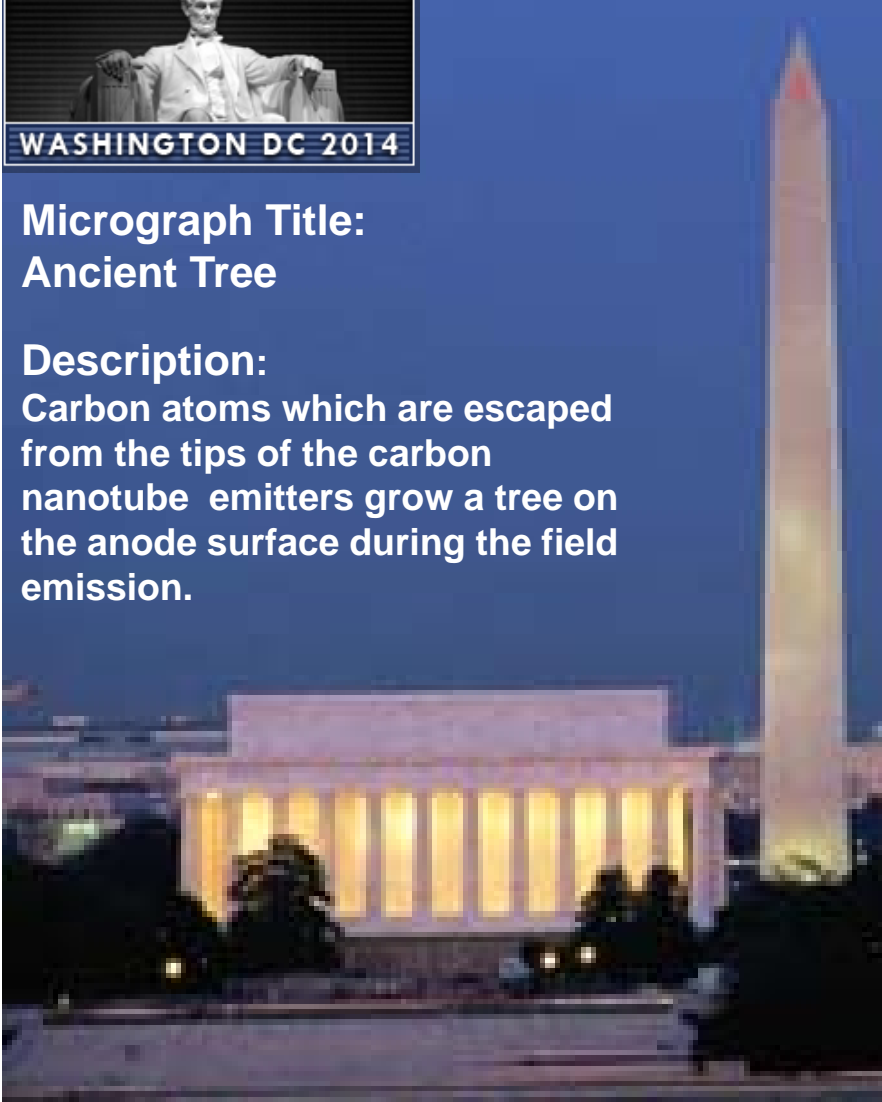
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Micrograph Title:
Ancient Tree

Description:

Carbon atoms which are escaped from the tips of the carbon nanotube emitters grow a tree on the anode surface during the field emission.



Magnification (3"x4" image): X5,000
Submitted by: Hai Hoang Van

Instrument : FESEM JEOL 7401F
Affiliation: Florida State University

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Micrograph Title:

Stalactitic Cave

Description:

The image took after photolithography, deep etching and silicon oxide dry thermal growth, and image is taken under 45° tilted and image rotated 180°.



	HV	curr	HFW	dwell	det	mode	tilt	WD	mag		 10 μm
	15.00 kV	0.20 nA	42.6 μm	10 μs	ETD	SE	45 °	4.0 mm	3 500 x		CNST NanoFab Helios FIB 2

Magnification (3"x4" image): 3.3X

Submitted by: Kuo-Tang Liao

Instrument : FEI Helios 650

Affiliation: CNST, NIST

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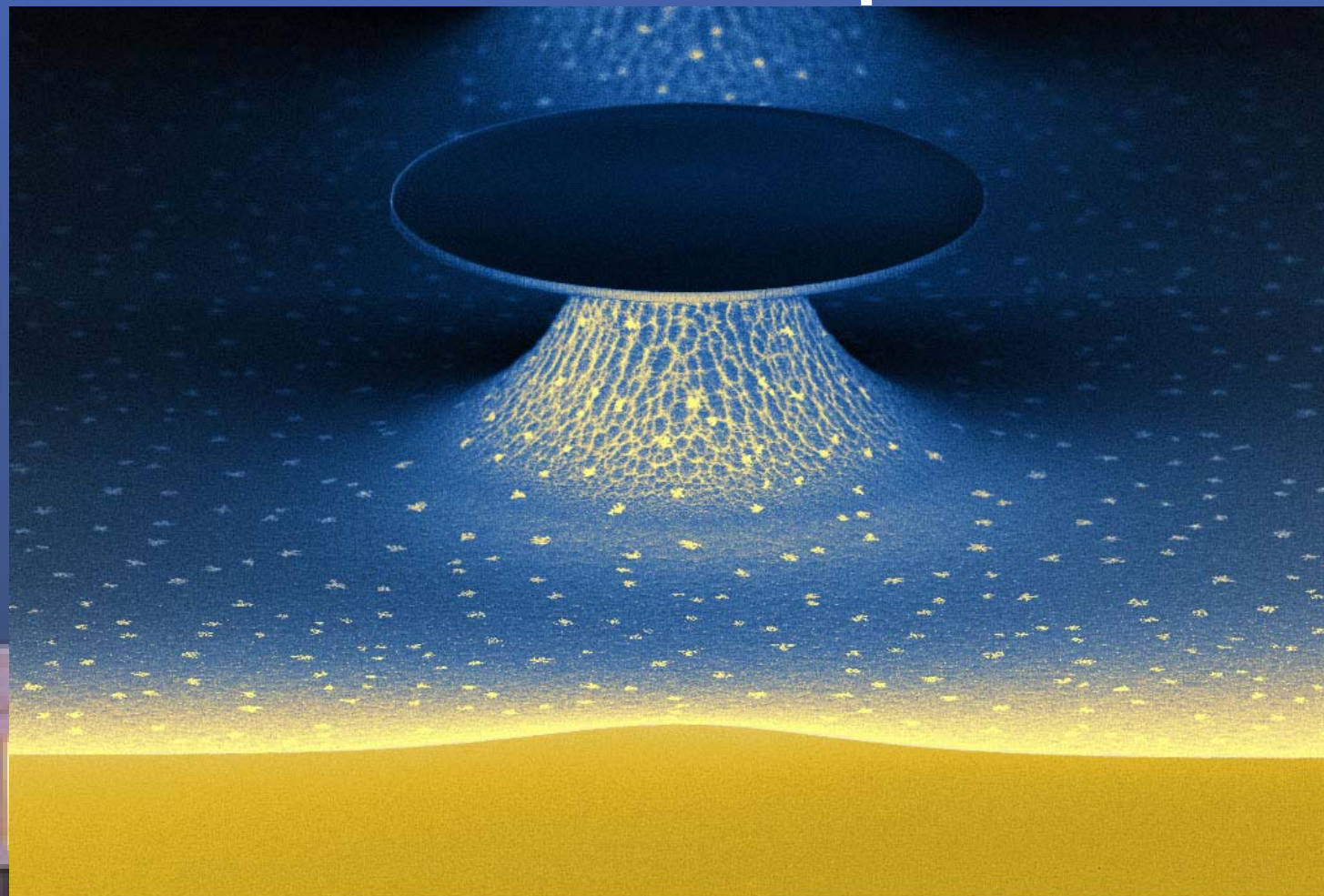


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Micrograph Title:
Tamed Volcano

Description:
Making of truncated
silicon cones using a
SiO₂ hard mask

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10 μ m



EHT = 1.00 kV

WD = 1.7 mm

Signal A = InLens

Mag = 1.00 K X

E5688 Eistüten V3

Mitte

Date : 8 Apr 2014



Magnification (3"x4" image): 1.0KX

Submitted by: Mathias Irmscher

Instrument : Zeiss Ultra 60

Affiliation: IMS Chips

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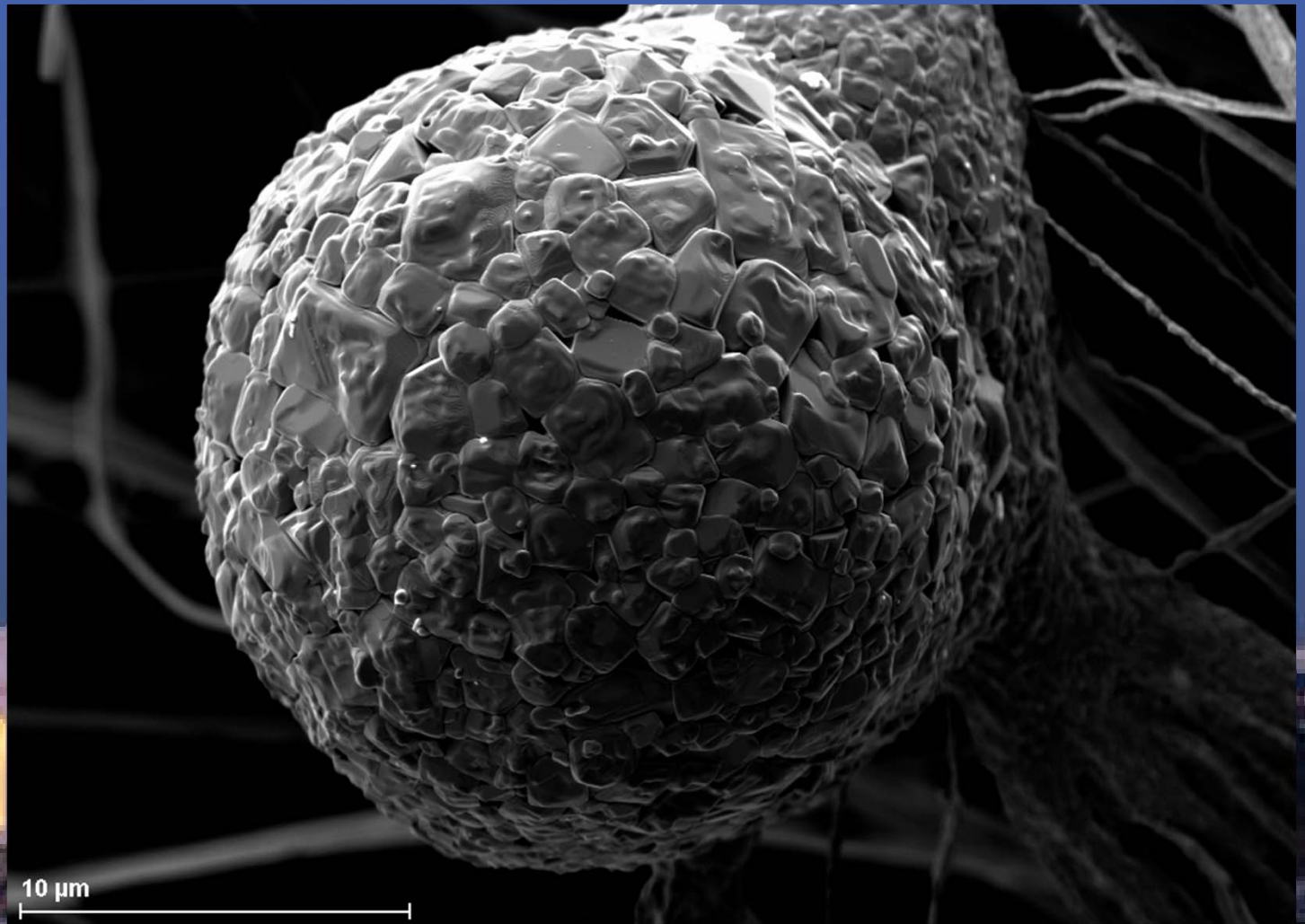


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Micrograph Title:
Disco Ball

Description:
Laser-induced
sintering/melting of
niobium nanowire

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Magnification (3"x4" image): 3.45KX

Instrument : Zeiss Sigma VP

Submitted by: Mike Chang, Seyed Mirvakili, John Madden, Alireza Nojeh

Affiliation: ECE, UBC

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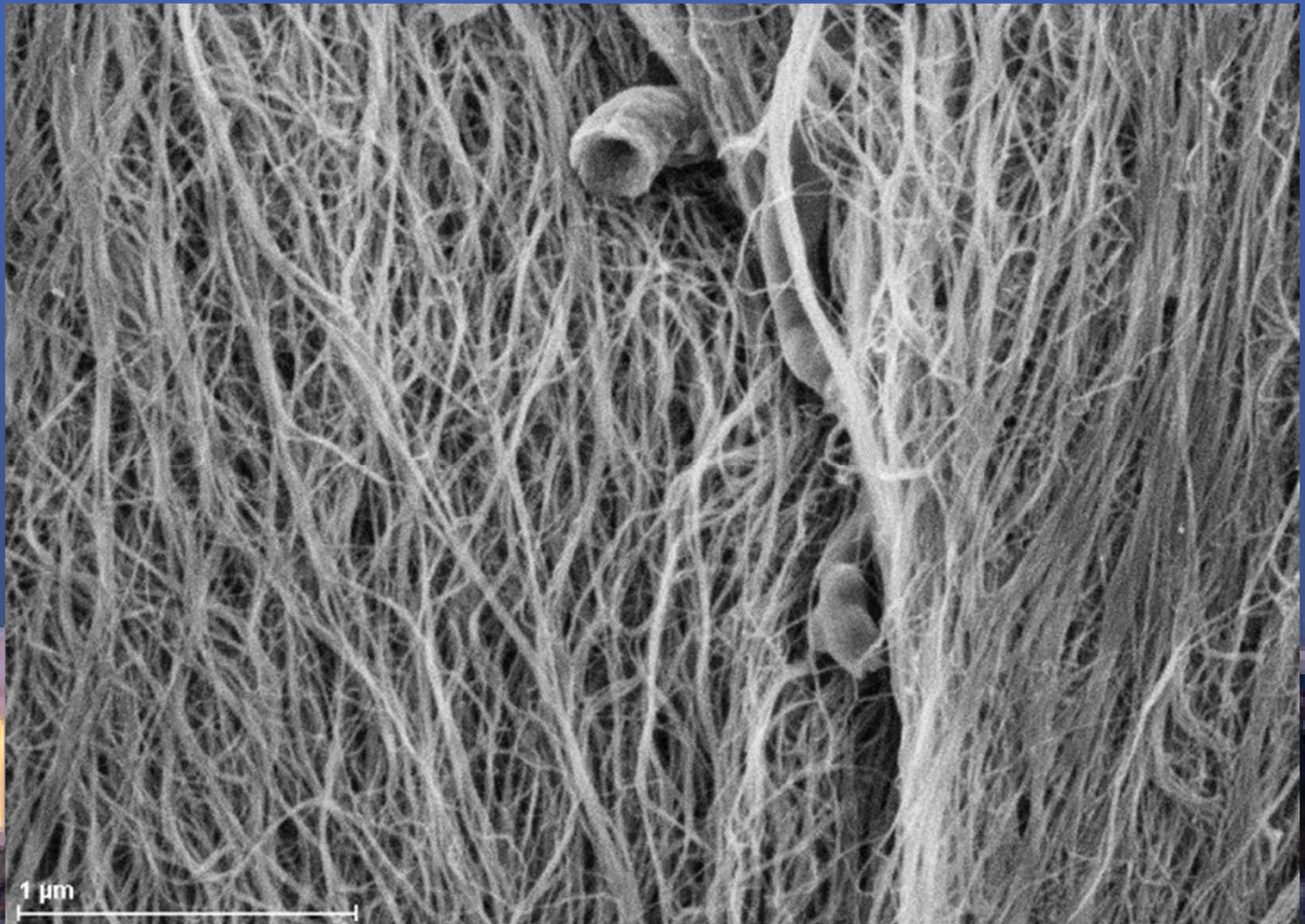


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Micrograph Title:
Caterpillar

Description:
A debris resembling a
caterpillar peeking
thought the carbon
nanotube forest



Magnification (3"x4" image): 29.84 KX
Submitted by: Mike Chang, Alireza Nojeh
Affiliation: ECE, UBC

Instrument : Zeiss Sigma VP

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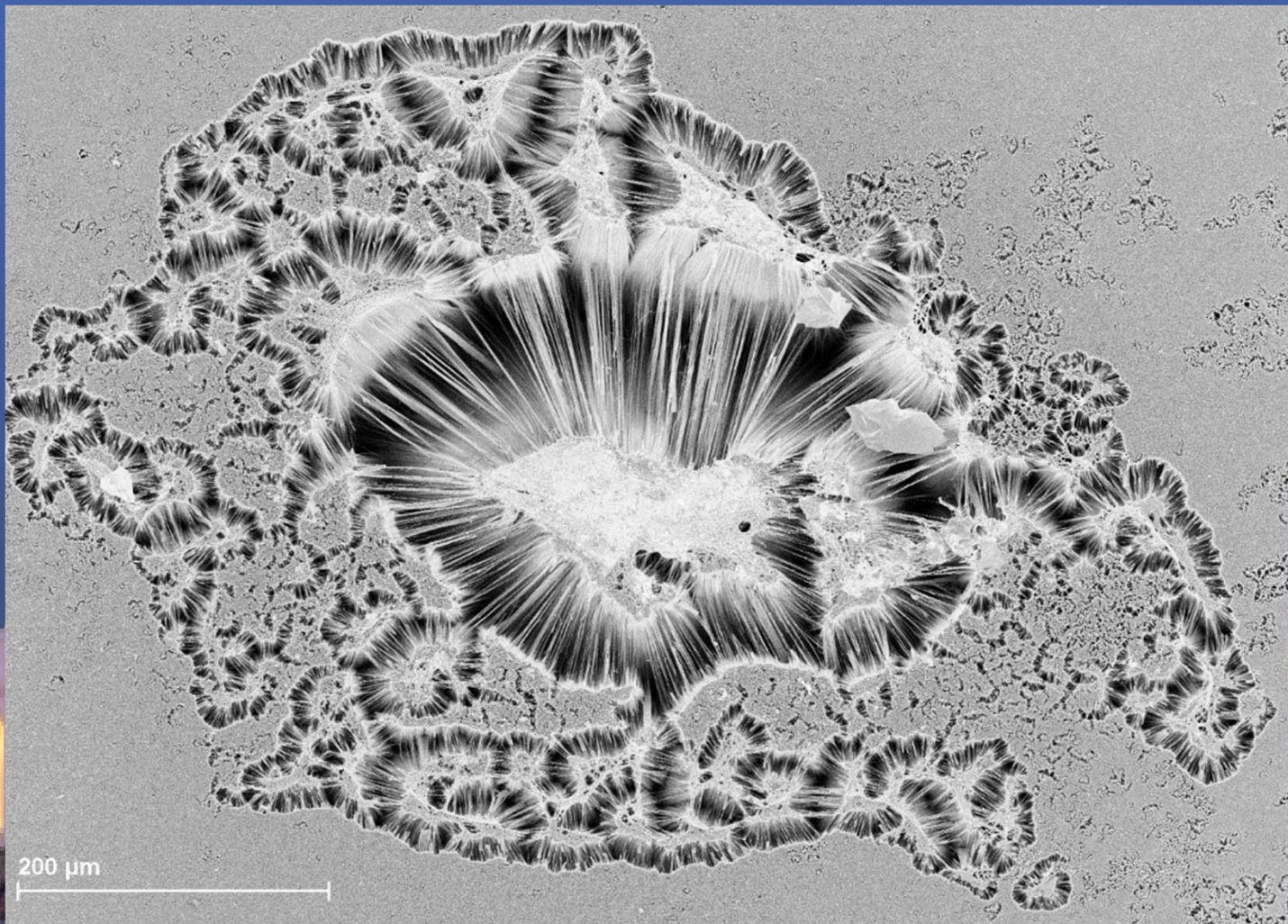


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Micrograph Title:
Dust Mite

Description:
The top view of a
carbon nanotube
forest resembling a
dust mite

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Magnification (3"x4" image): 137X **Instrument : Zeiss Sigma VP**
Submitted by: Mike Chang, Alireza Nojeh
Affiliation: ECE, UBC

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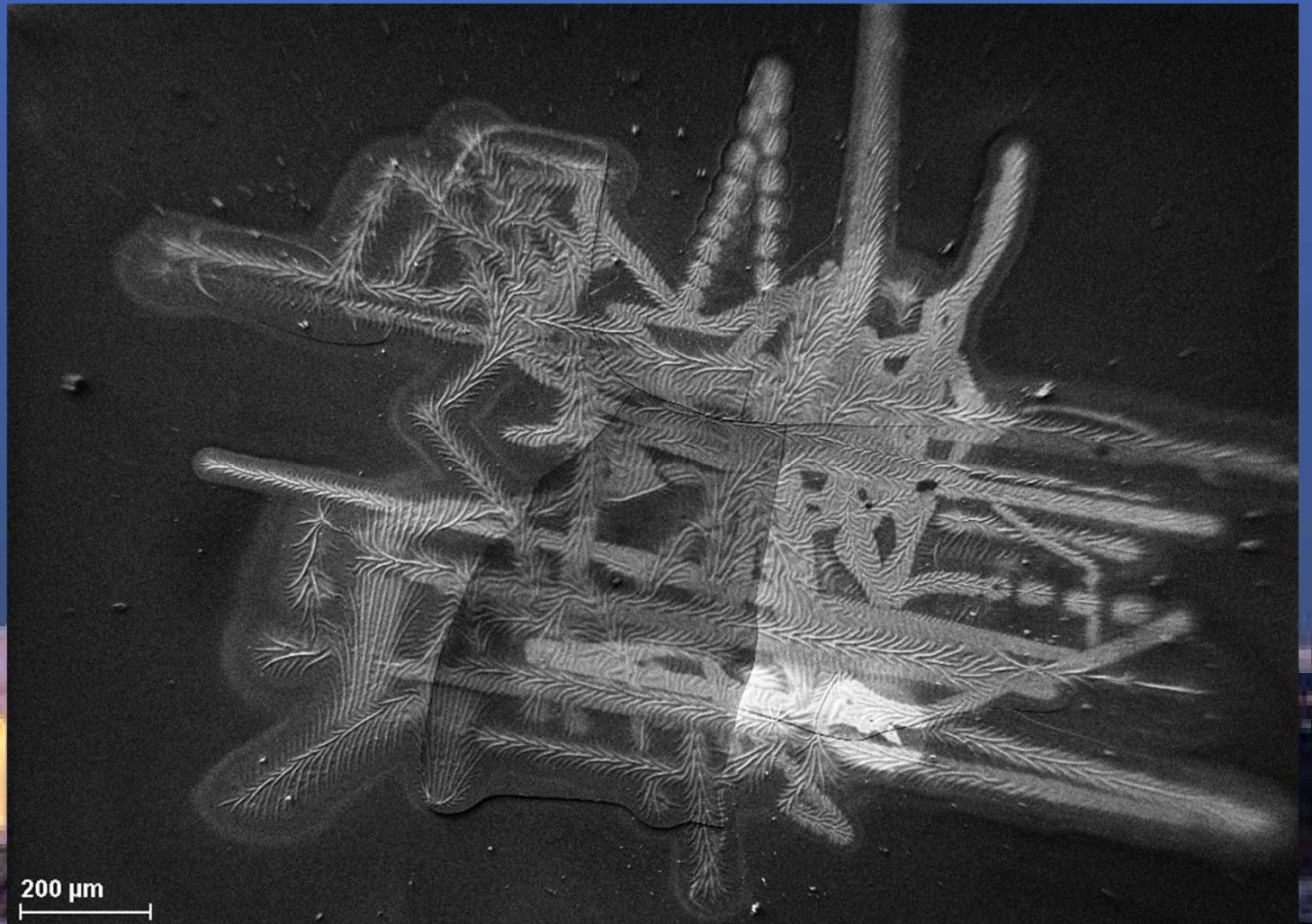


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Micrograph Title:
Fossil Graffiti

Description:
An interesting pattern
on a damaged ITO
collector

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Magnification (3"x4" image): 58X **Instrument : Zeiss Sigma VP**
Submitted by: Mike Chang, Alireza Nojeh
Affiliation: ECE, UBC

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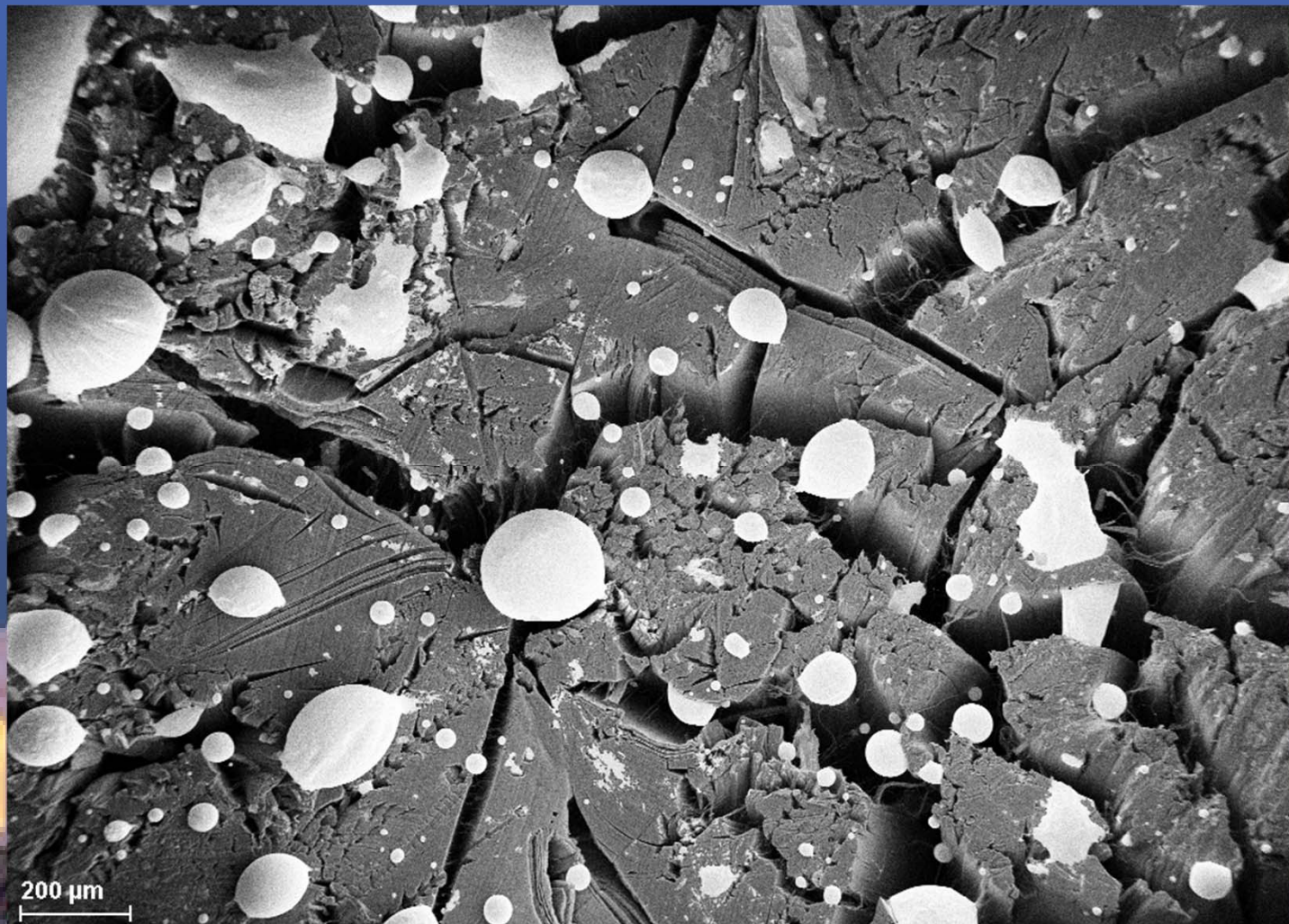


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Micrograph Title:
Got Milk ?

Description:
Caesium-
encapsulated carbon
nanotube forest,
prepared by
submerging in
cesium carbonate
solution

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Magnification (3"x4" image): 49X **Instrument : Zeiss Sigma VP**
Submitted by: Mike Chang , Amir Khoshaman, Alireza Nojeh
Affiliation: ECE, UBC

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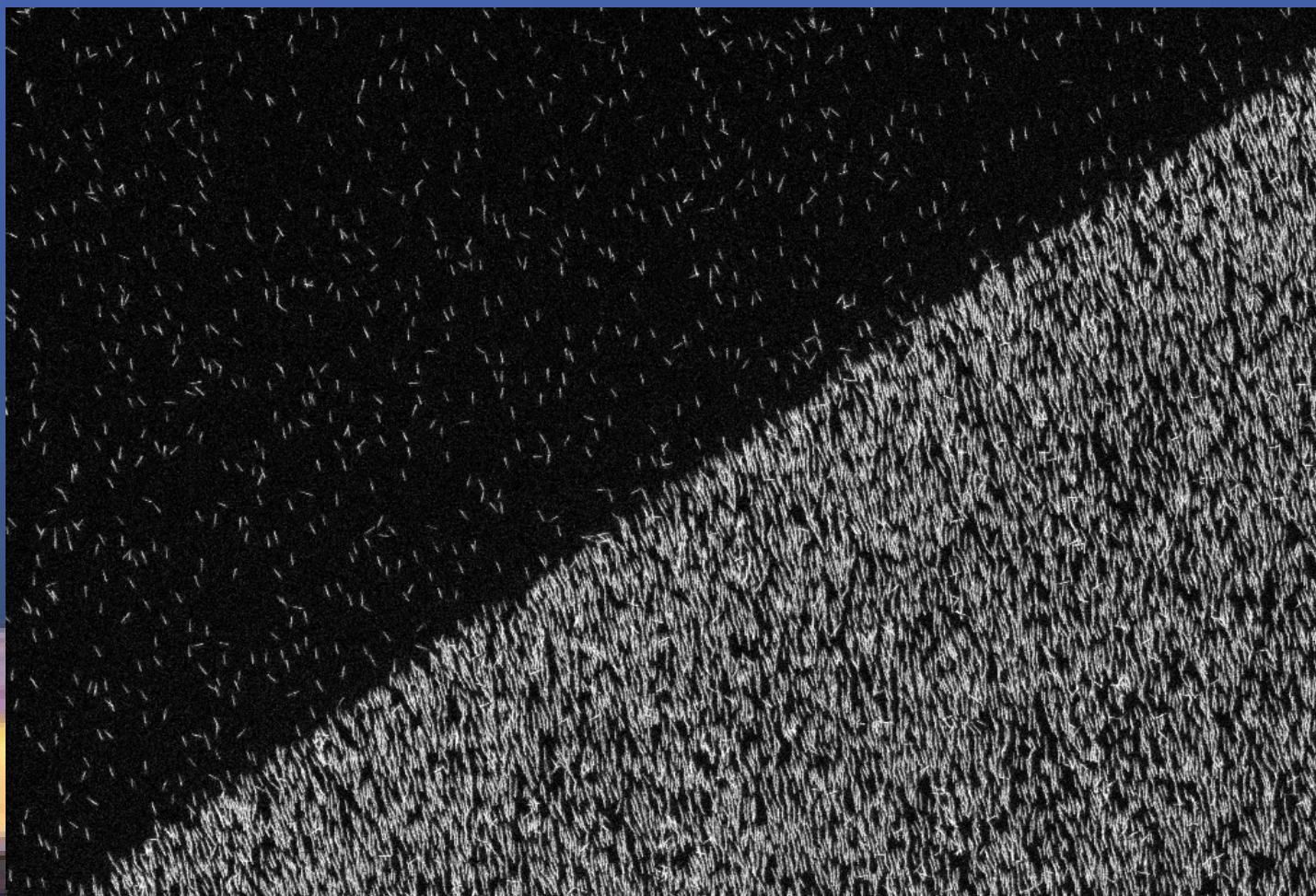
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Micrograph Title:
Nano-storm

Description:

After exposure of HSQ by electron beam lithography at extremely low doses, instead of formation of full structures, flakes of HSQ is formed which gets dispersed all over the substrate giving impression of a storm in nanometer scale



Magnification (3"x4" image): 13.45KX **Instrument : Zeiss Supra VP55 2005**
Submitted by: Waiz Karim **Affiliation: ETH Zurich and Paul Scherrer**
Institute, Switzerland

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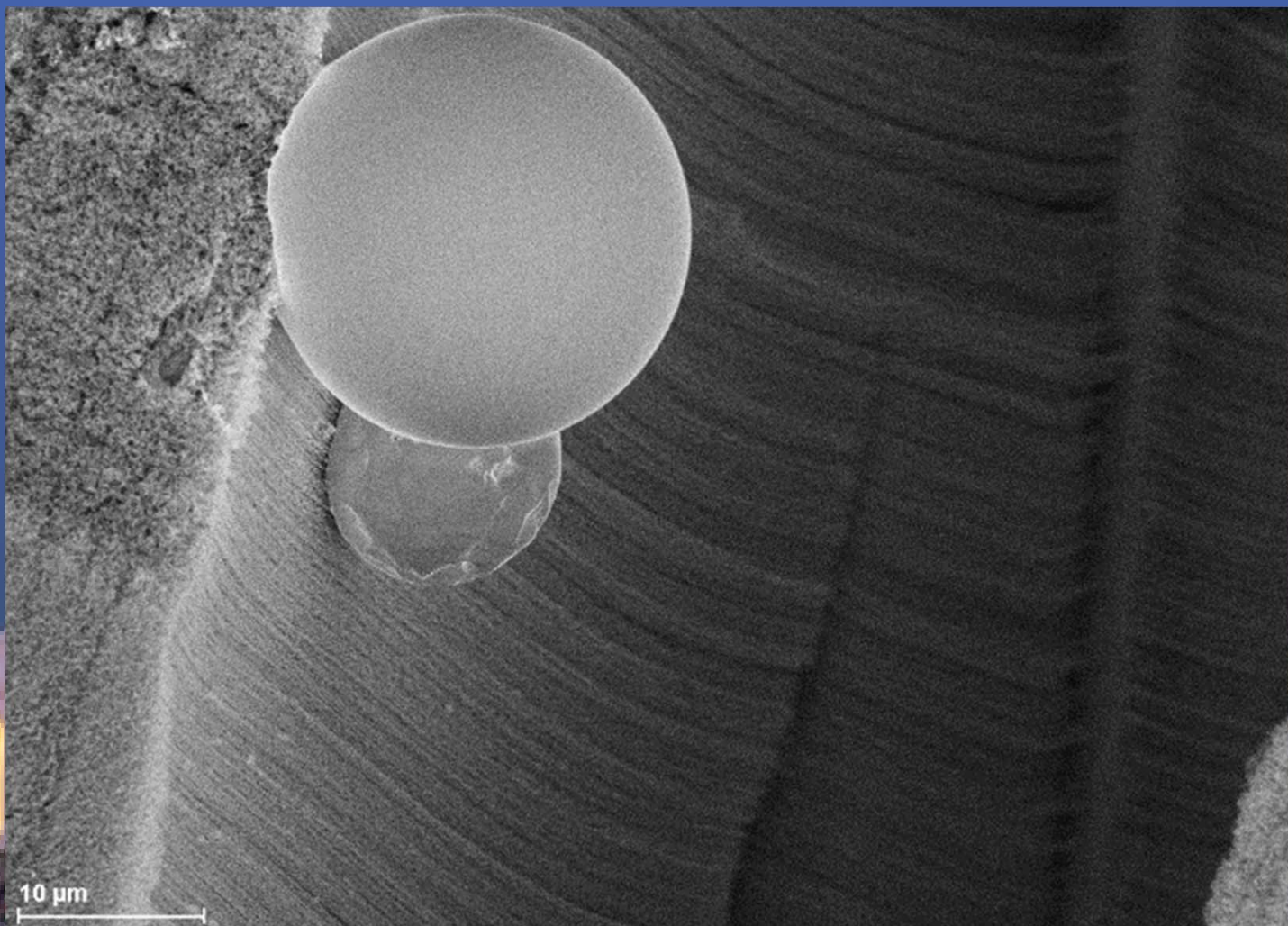


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Micrograph Title:
Let's roll !

Description:
Caesium-
encapsulated carbon
nanotube forest,
prepared by
submerging in
cesium carbonate
solution

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Magnification (3"x4" image): 1.65KX **Instrument :** Zeiss Sigma VP
Submitted by: Mike Chang, Amir Khoshaman, Alireza Nojeh
Affiliation: ECE, UBC

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Micrograph Title:
Maelstrom

Description:
The top of a carbon
nanotube forest

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Magnification (3"x4" image): 2.54KX

Instrument : Zeiss Sigma VP

Submitted by: Mike Chang, Alireza Nojeh

Affiliation: ECE, UBC

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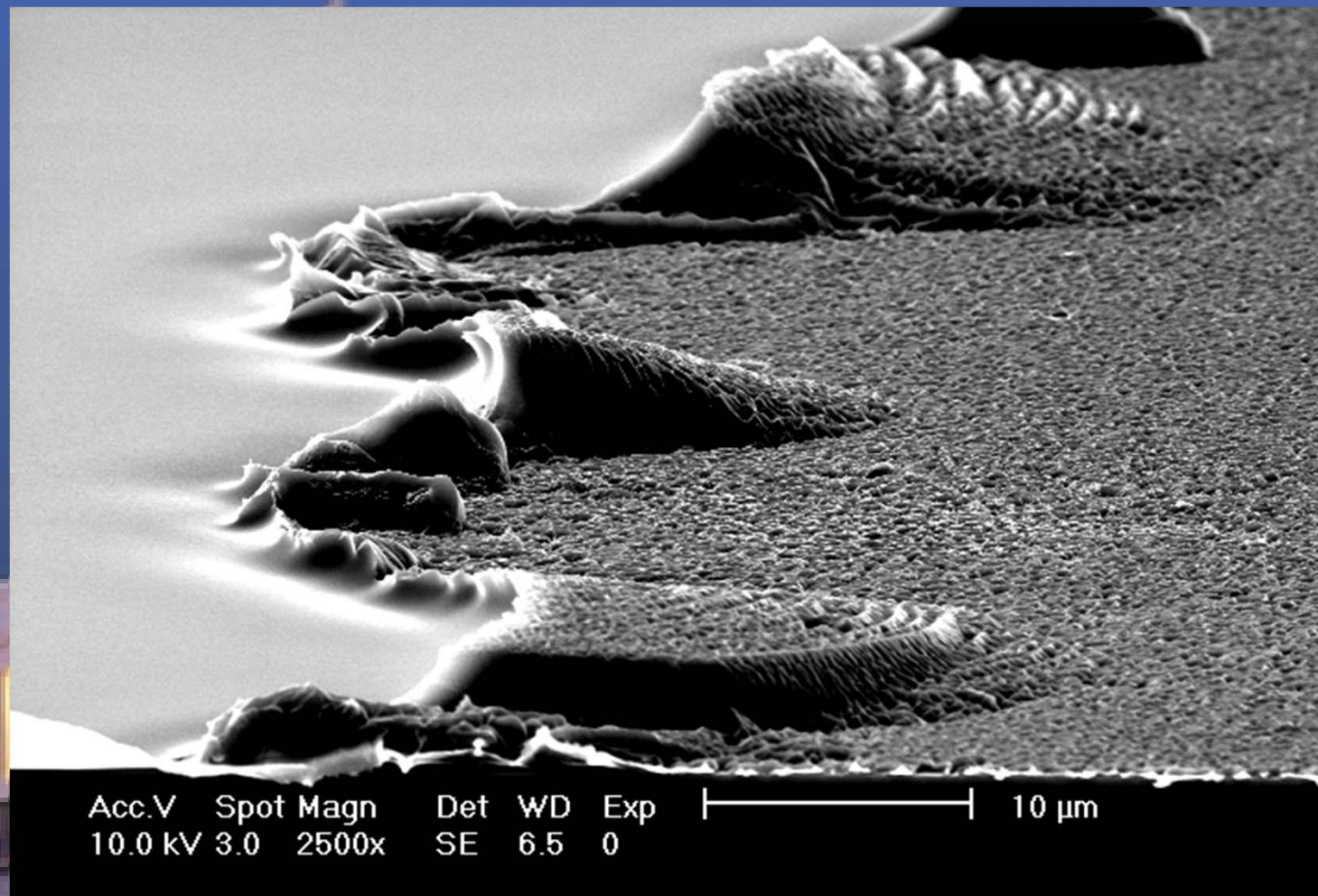
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Micrograph Title:

Warning! Tsunami coming

Description:

Imprint into PS by stamp with about 500 nm (lateral and vertical) pyramidal structures etched via black Si process



Magnification (3"x4" image): 2.5KX

Instrument : FEI XL 30S

Submitted by: Si Wang

Affiliation: University of Wuppertal

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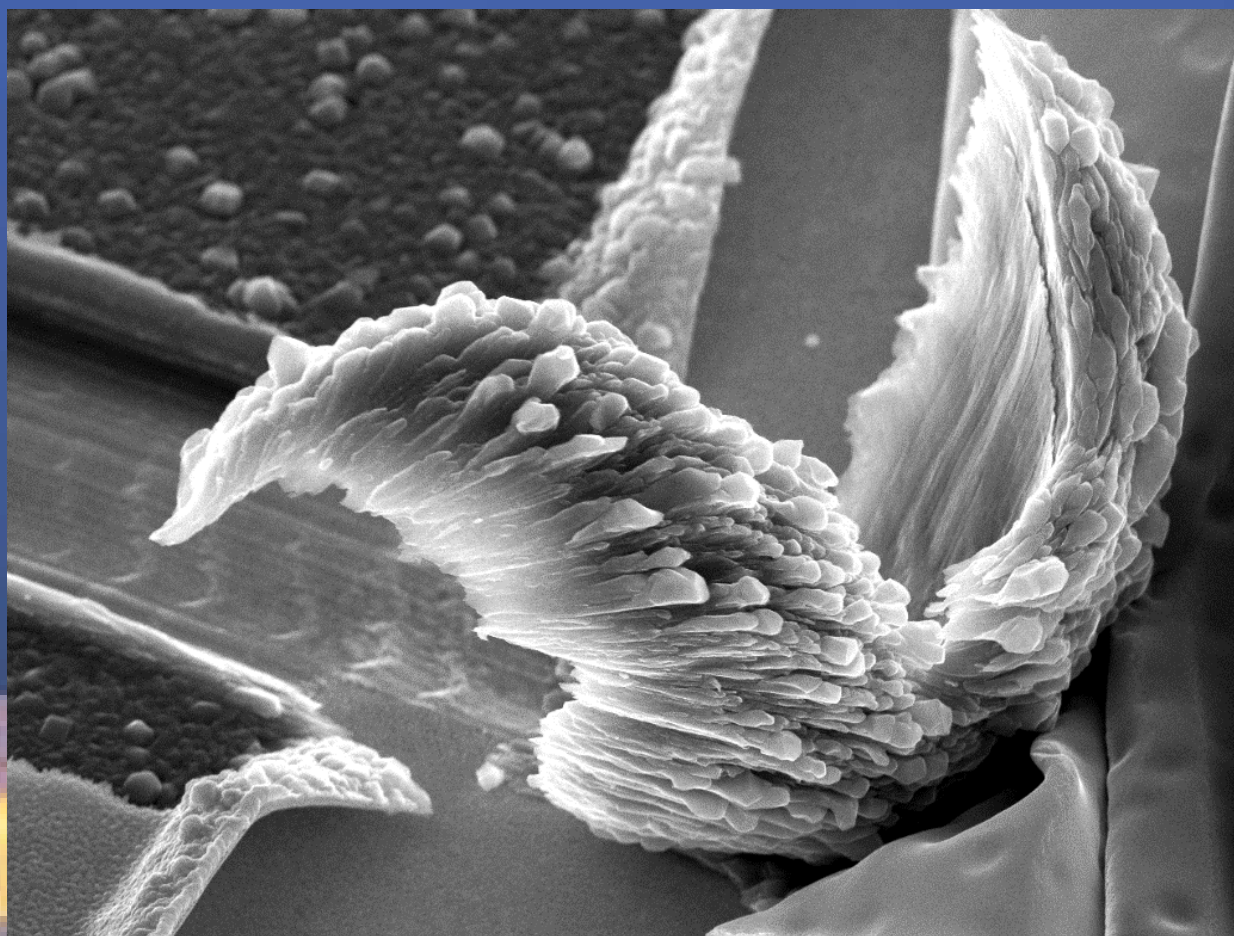


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Micrograph Title:
GODZILLA (2014)

Description: You are
so tiny, I am not afraid!

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X 7,000

10.0kV SEI

SEM

1µm 4/13/2014

WD 12mm 11:16:13

Magnification (3"x4" image): 7k x
Submitted by: Shuang Pi

Instrument : JEOL JSM-7001F
Affiliation: University of Massachusetts

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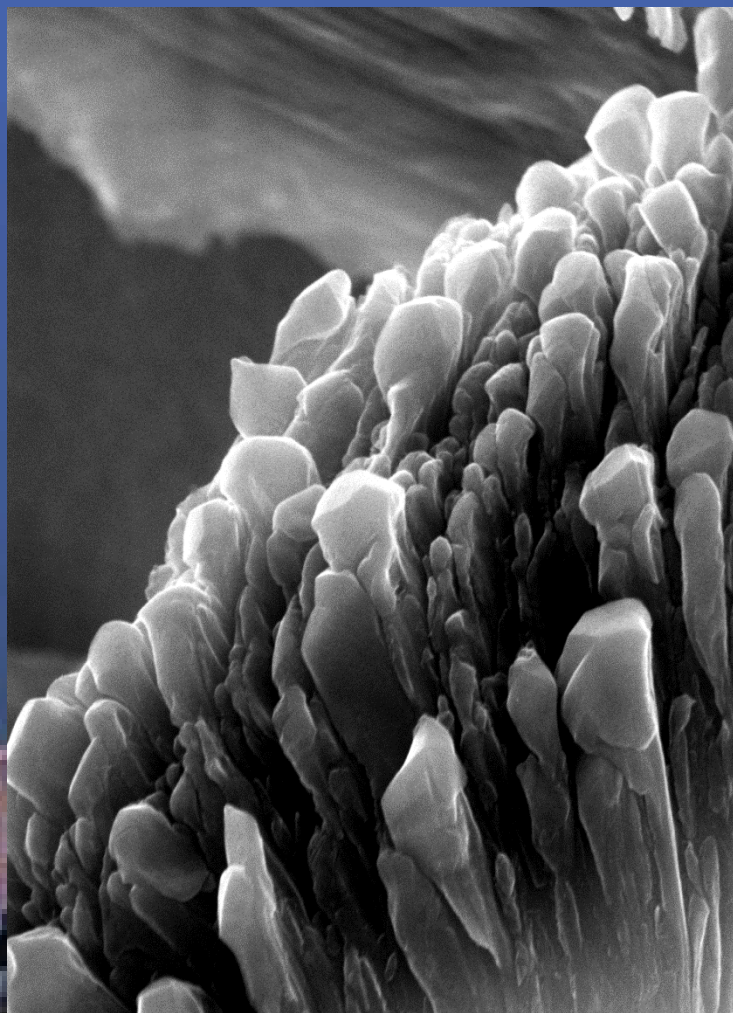


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Micrograph Title:
South China Karst

Description: Nano
stone forest made of
 Al/AlO_x by mechanical
scribing.



Magnification (3"x4" image): 22k x
Submitted by: Shuang Pi

Instrument : JEOL JSM-7001F
Affiliation: University of Massachusetts

EIPBN

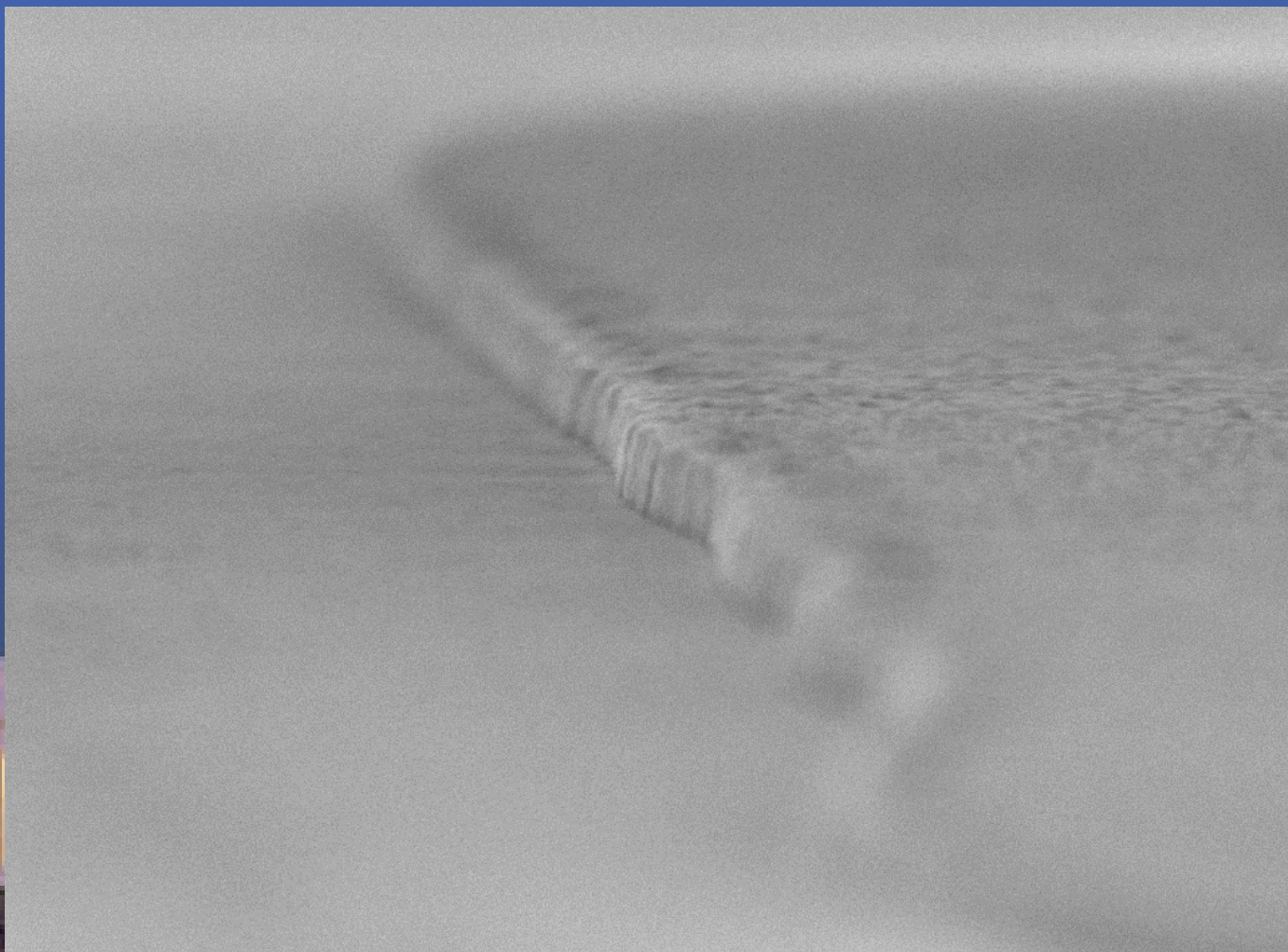


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Micrograph Title:
Mist Coast

Description:
Patterned Au/Ni on
SiO₂ substrate.



Magnification (3"x4" image): 50k x
Submitted by: Shuang Pi

Instrument : JEOL JSM-7001F
Affiliation: University of Massachusetts

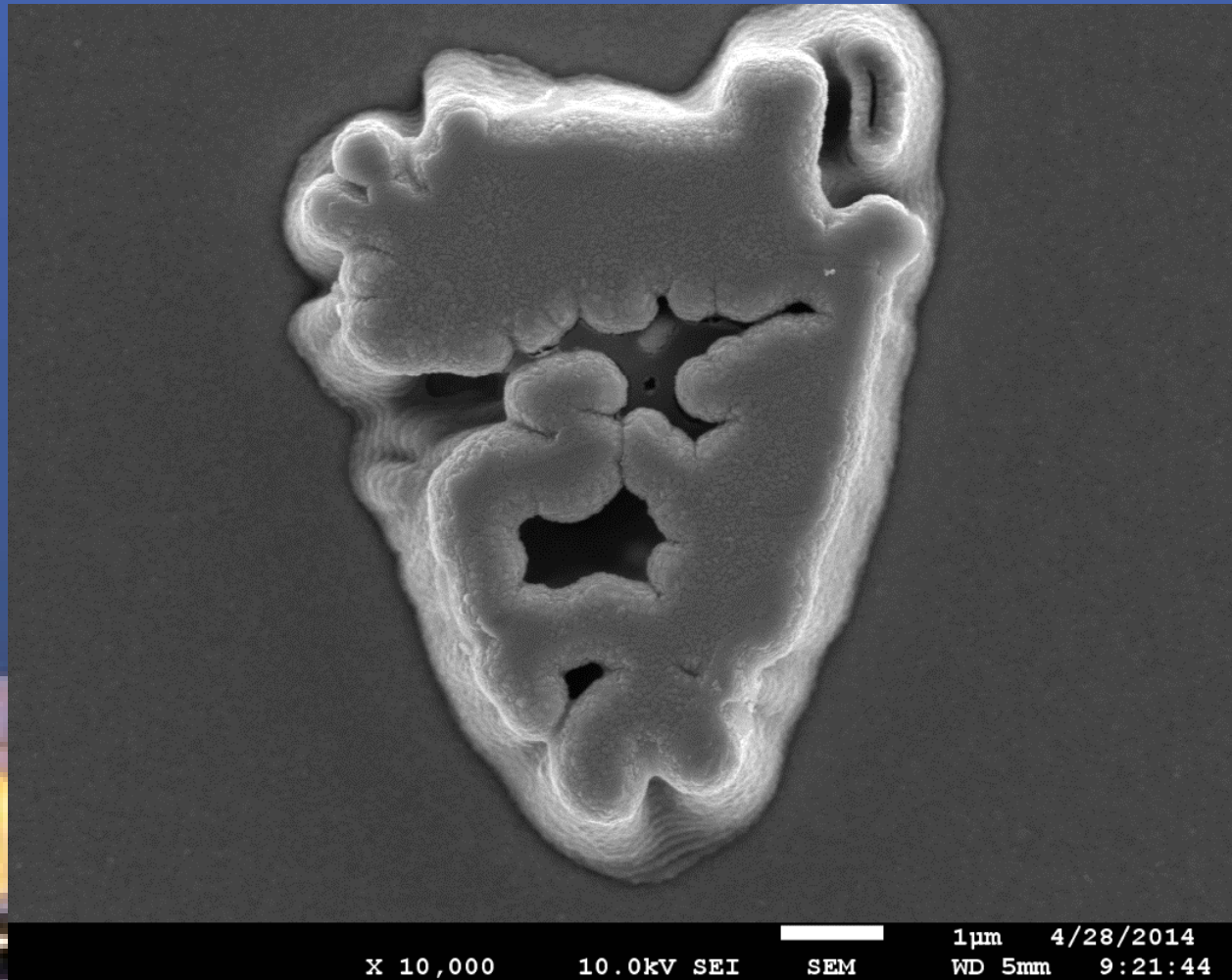
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Micrograph Title:
Frustrated Face

Description: Oh,
No! What an
unexpected result is
this? Tomorrow is
due!



Magnification (3"x4" image): 10k x
Submitted by: Shuang Pi

Instrument : JEOL JSM-7001F
Affiliation: University of Massachusetts

EIPBN

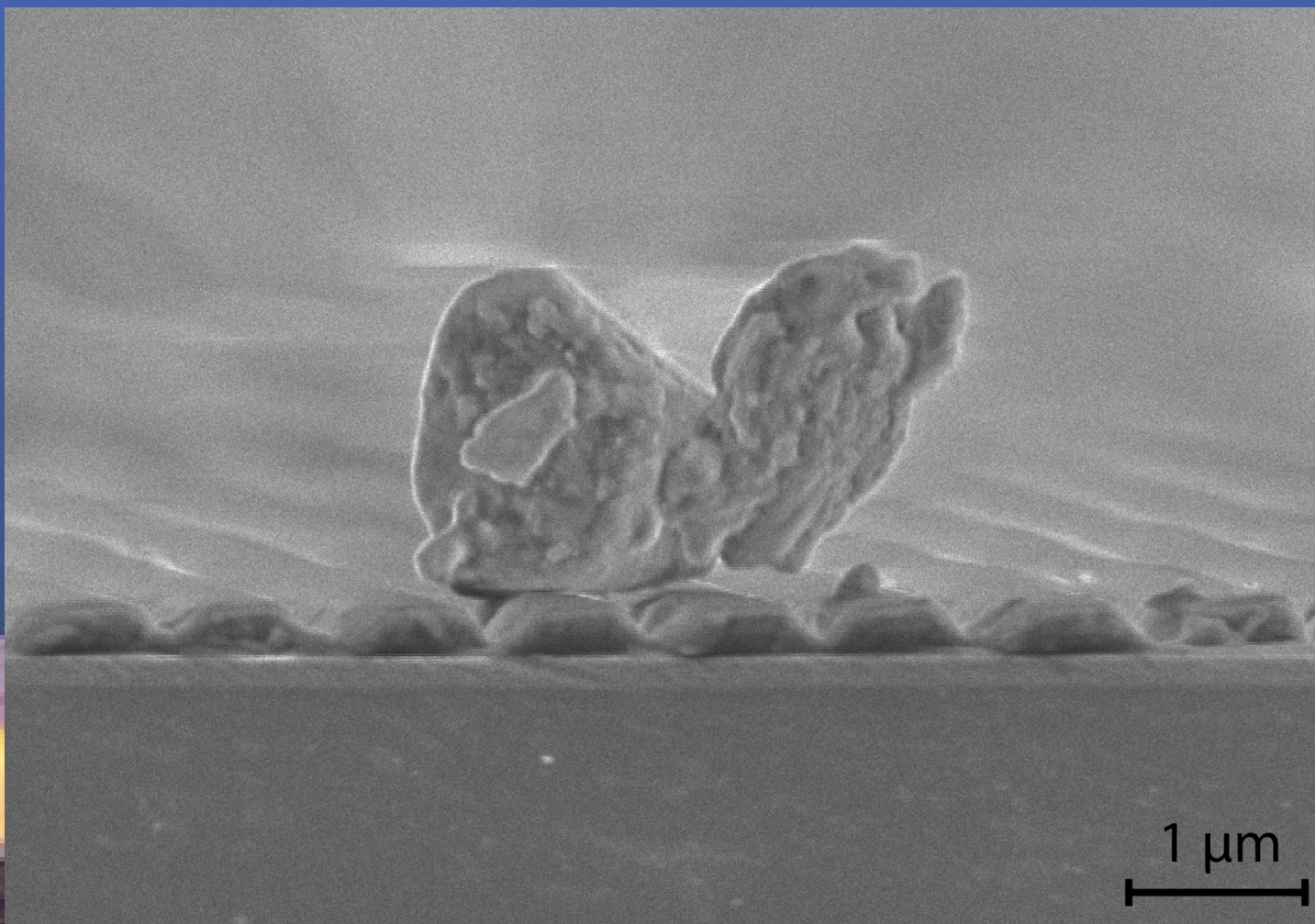


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Micrograph Title:
Puppy goes surfing

Description:
Not only Eddie would go. Look! This cute flake “puppy” is surfing on top of the polymeric waves.

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Magnification (3“x4” image): 15KX
Submitted by: Peng Lin

Instrument : JOEL JSM-7001F
Affiliation: University of Massachusetts

EIPBN

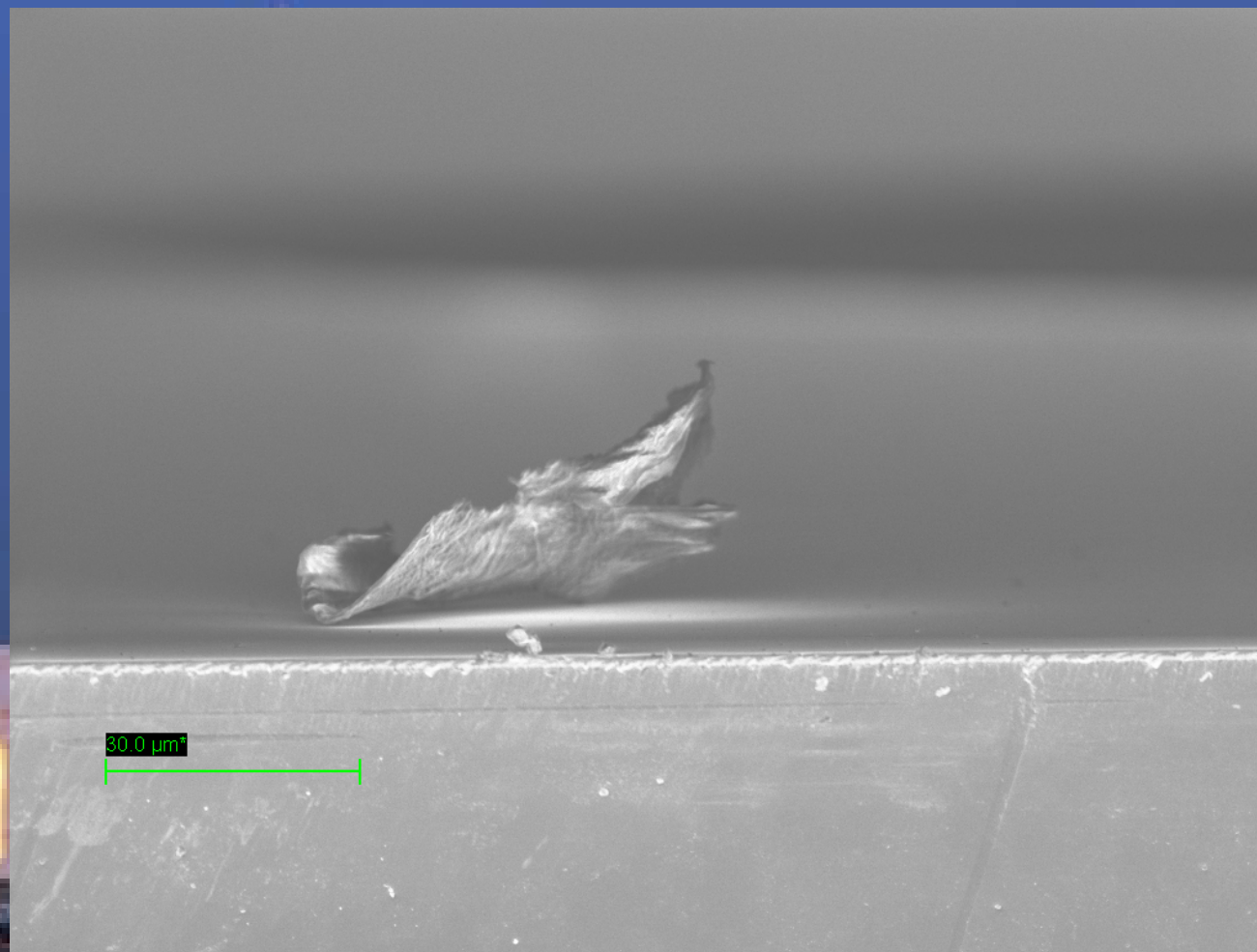


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Micrograph Title:
The Hungry
Nanoflake
“Feed me!”

Description:
Creature was found
while cross-
sectioning ion-milled
gold nano-gratings
on a silicon substrate

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Magnification (3"x4" image): 2.01 KX
Submitted by: Rich Kasica & Gerard Henein

Instrument : Zeiss Ultra 60 FE-SEM
Affiliation: NIST

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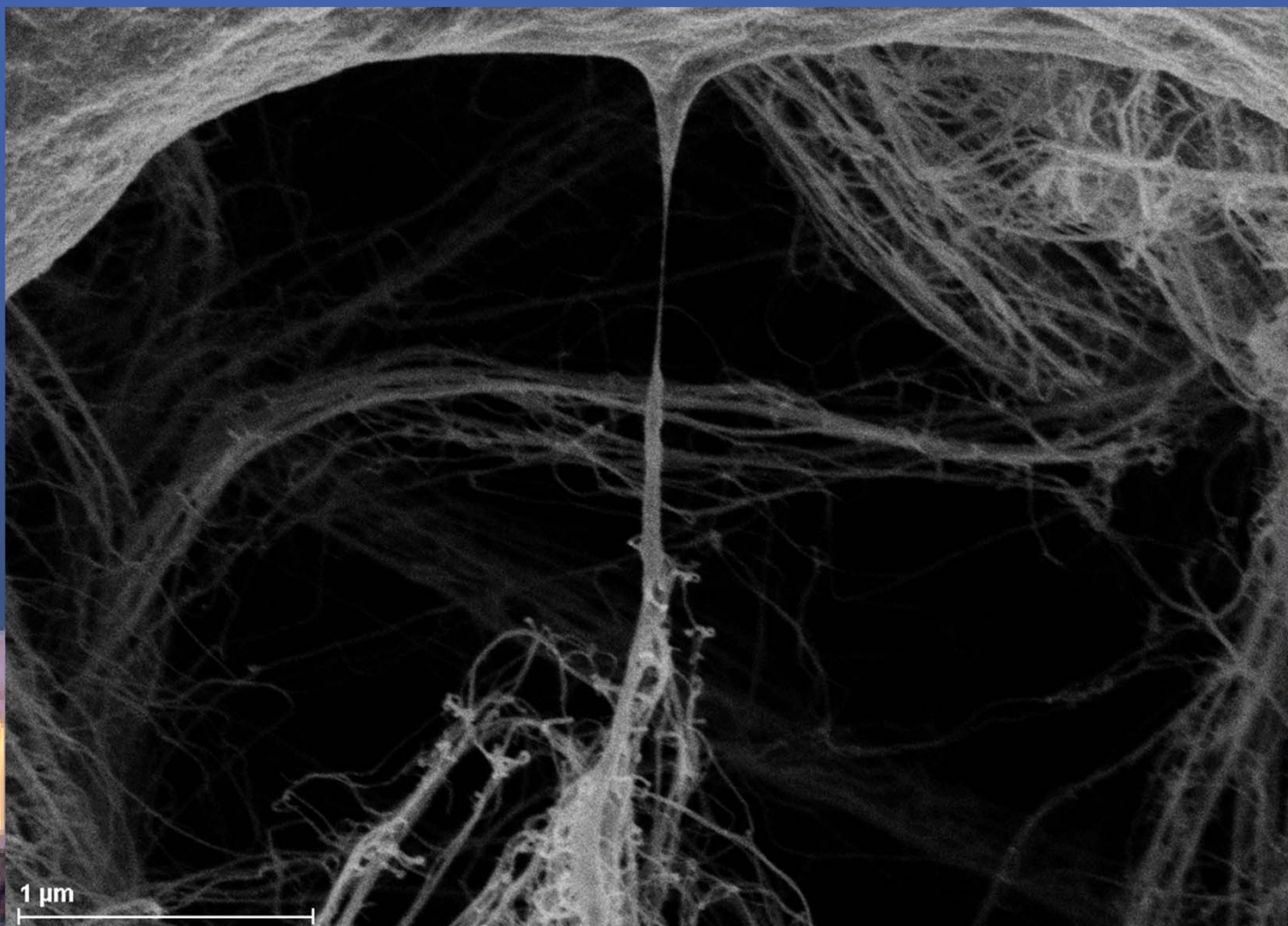


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Micrograph Title:
Stalagnate/Column

Description:
Aqueous dispersion
of single-walled
carbon nanotube

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Magnification (3"x4" image): 26.03KX
Submitted by: Mike Chang, Alireza Nojeh
Affiliation: ECE, UBC

Instrument : Zeiss Sigma VP

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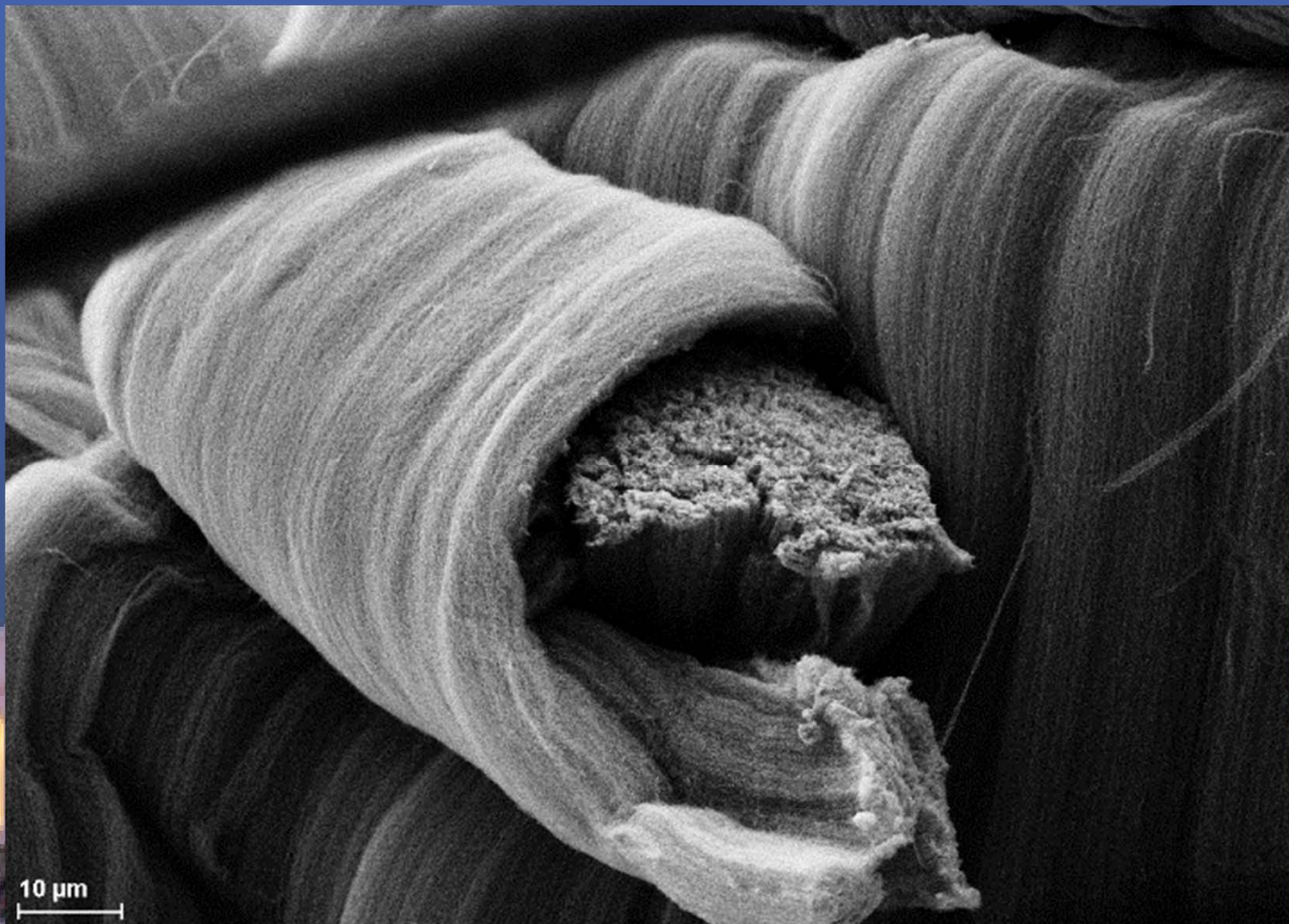


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Micrograph Title:
Sushi

Description:
A rolled up sheet of
carbon nanotubes at
the edge of a CNT
forest



Magnification (3"x4" image): 913X **Instrument : Zeiss Sigma VP**
Submitted by: Mike Chang, Alireza Nojeh
Affiliation: ECE, UBC

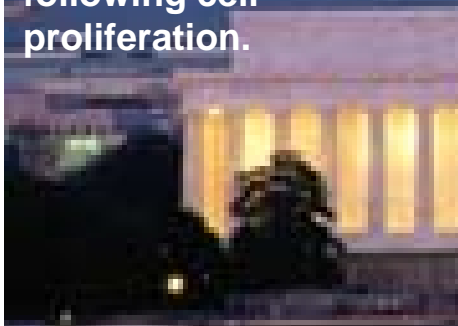
EIPBN



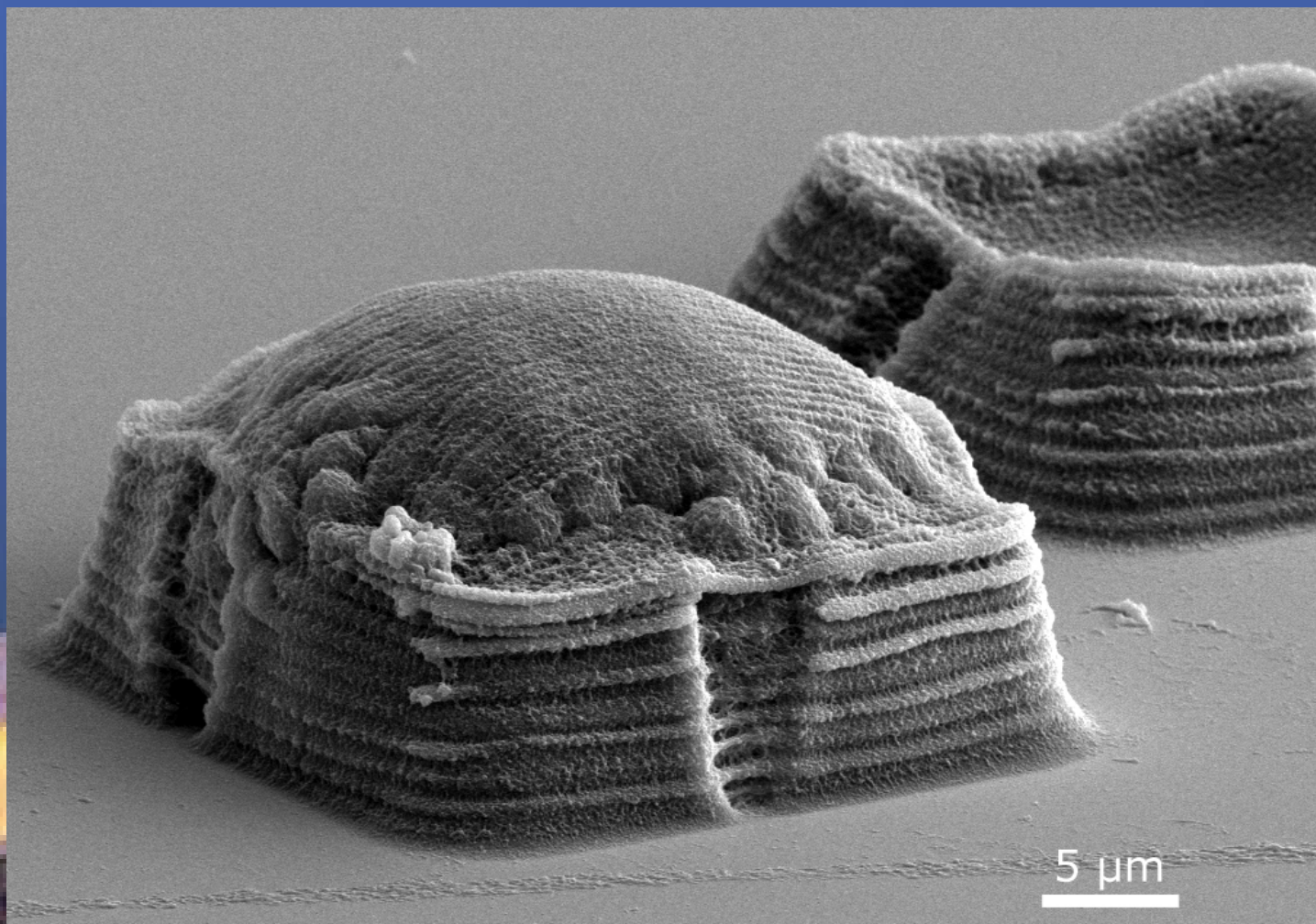
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Micrograph Title:
Cell Hobbit House

Description:
SEM image of yeast cells confined in microfabricated hydrogel structures bulging out the roof of their house following cell proliferation.



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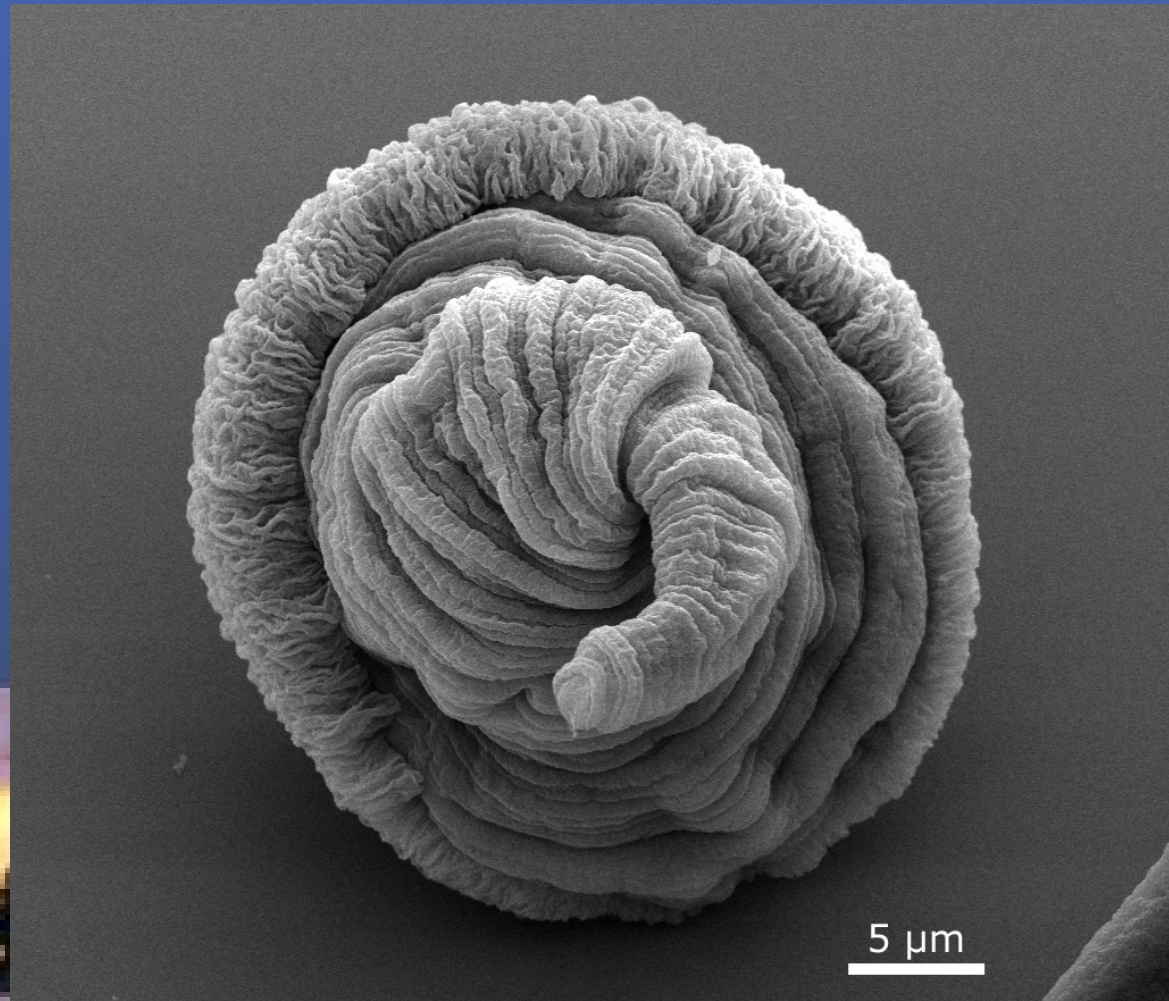
Magnification (3"x4" image): 3500KX Instrument : (FEI Quanta series)
Submitted by: Bryan Kaehr Affiliation: Sandia National Laboratories

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Micrograph Title:
Deflated Micro-
Balloon
Description: SEM
image of a chitin
coated alginate
microparticle
following
dehydration.



Magnification (3"x4" image): 3500KX **Instrument :** (FEI Quanta series)
Submitted by: Bryan Kaehr **Affiliation:** Sandia National Laboratories

EIPBN

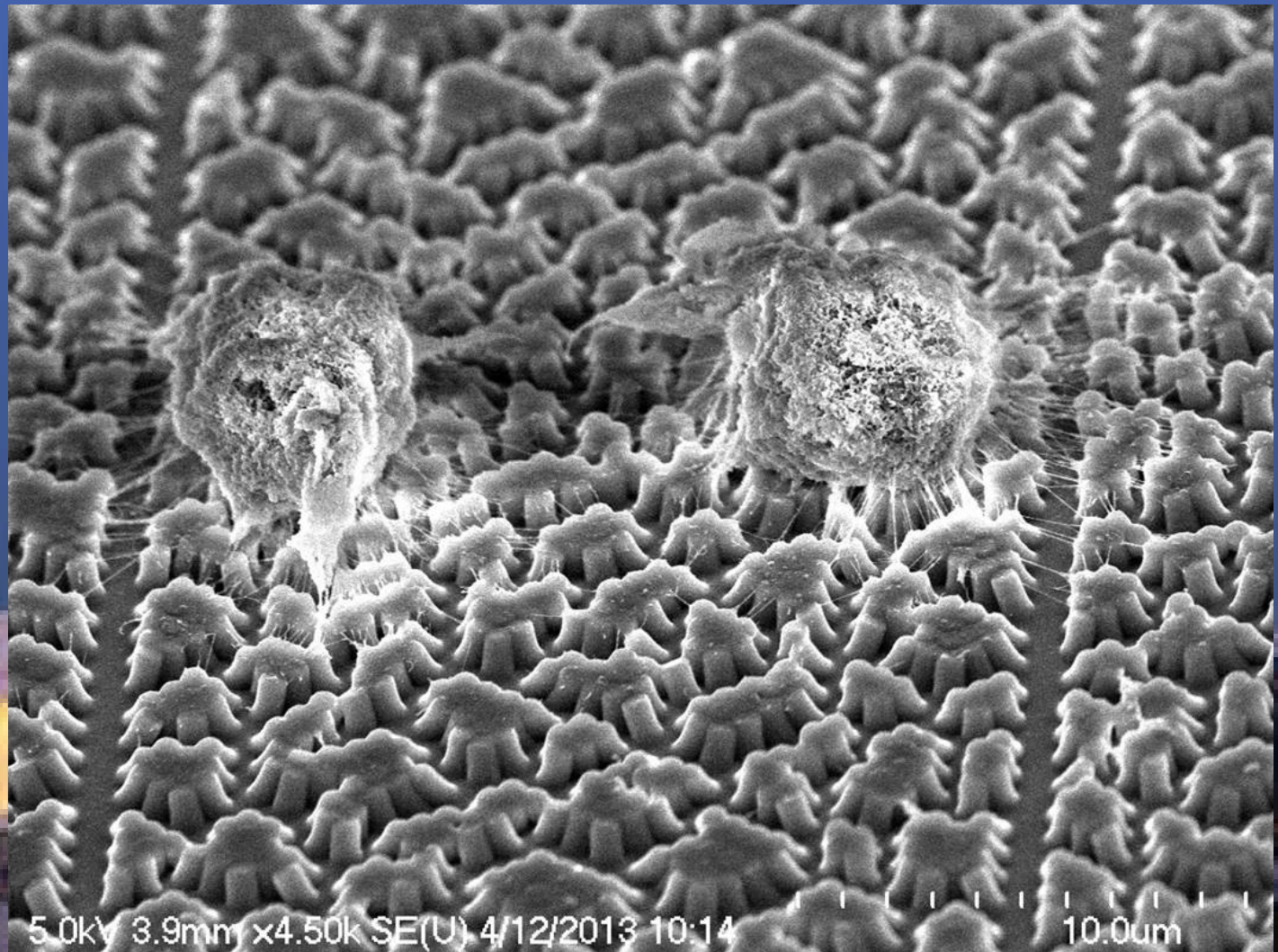


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Micrograph Title:
All-Terrain Warriors

Description:
T cells on PDMS
Pillars



Magnification (3"x4" image): 4.5KX
Submitted by: Saba Ghassemi

Instrument : Hitachi 4700 SEM
Affiliation: UPenn

EIPBN

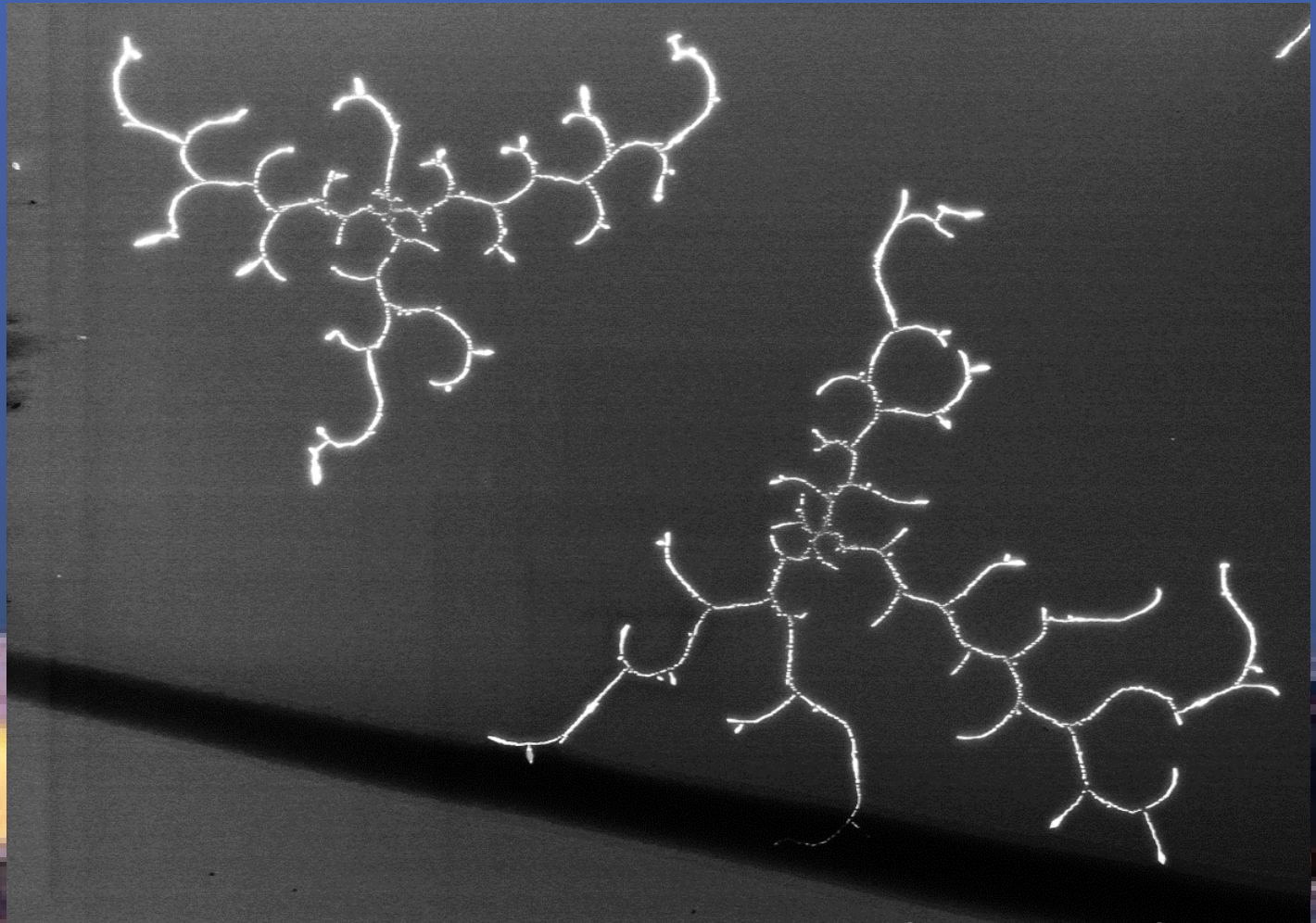


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Micrograph Title:
Embrace of
Scorpions

Description: The
block copolymer
scorpions embrace
each other with
their claws,
exposing their
lethal tails. Love at
first sting, and it
hurts so good.

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Magnification (3"x4" image): -1.2KX
Submitted by: Mikai Chen

Instrument : Hitachi SU8000
Affiliation: University of Michigan

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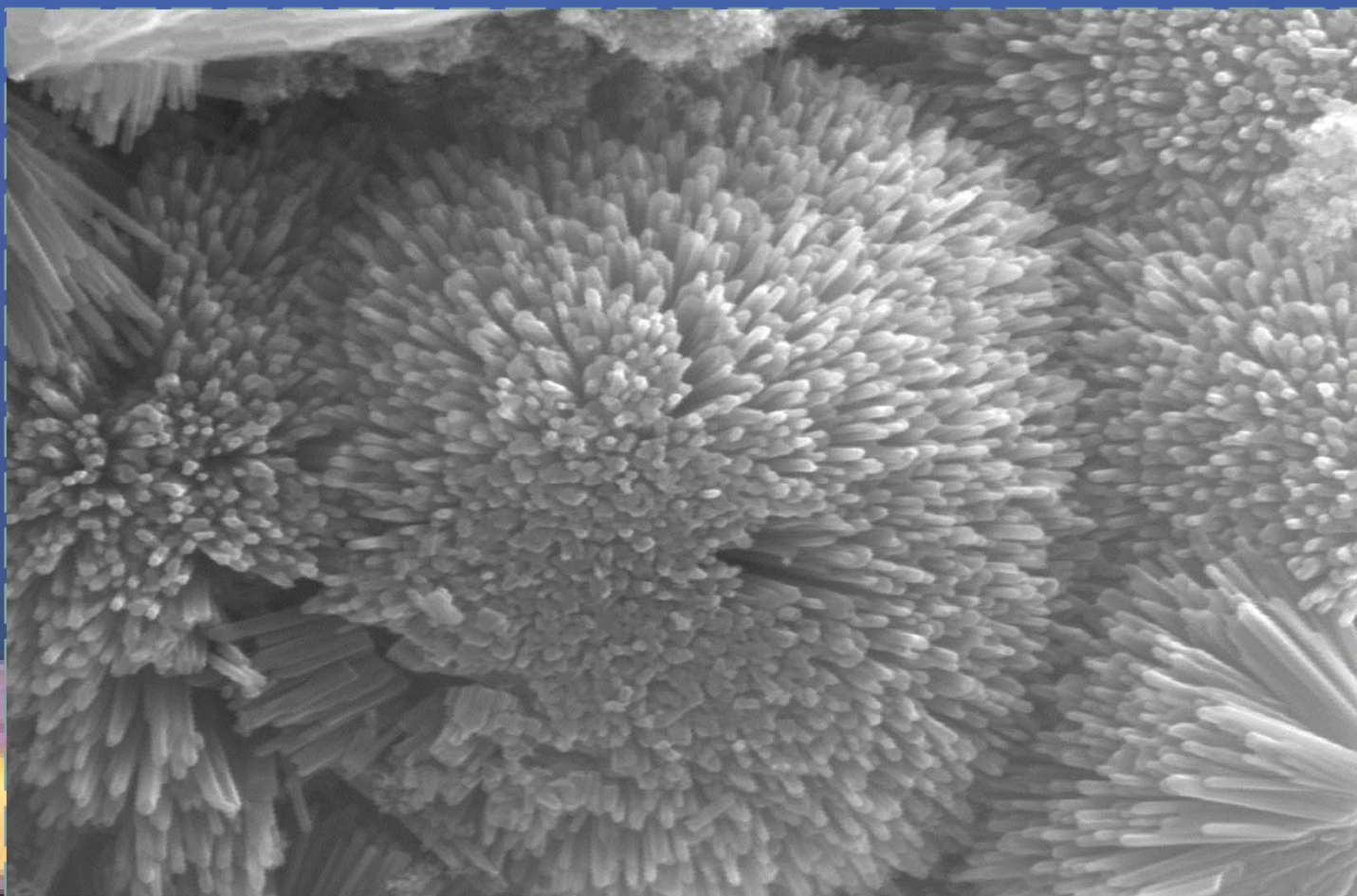
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Micrograph Title:

Grey Marigold
Garden

Description: ZnO
Nano-flower
synthesized by
simple dry mechano-
chemical method
followed by thermal
decomposition.



3/21/2011	HV	mag	WD	det
6:26:32 PM	30.00 kV	30 000 x	10.0 mm	ETD

2 μ m

Magnification (3"x4" image): 0.3KX

Instrument : F E I Quanta FEG

200 - High Resolution Scanning Electron Microscope

Submitted by: D. Selvakumari Cecil

Affiliation: University of Madras , Chennai, Tamilnadu, India.

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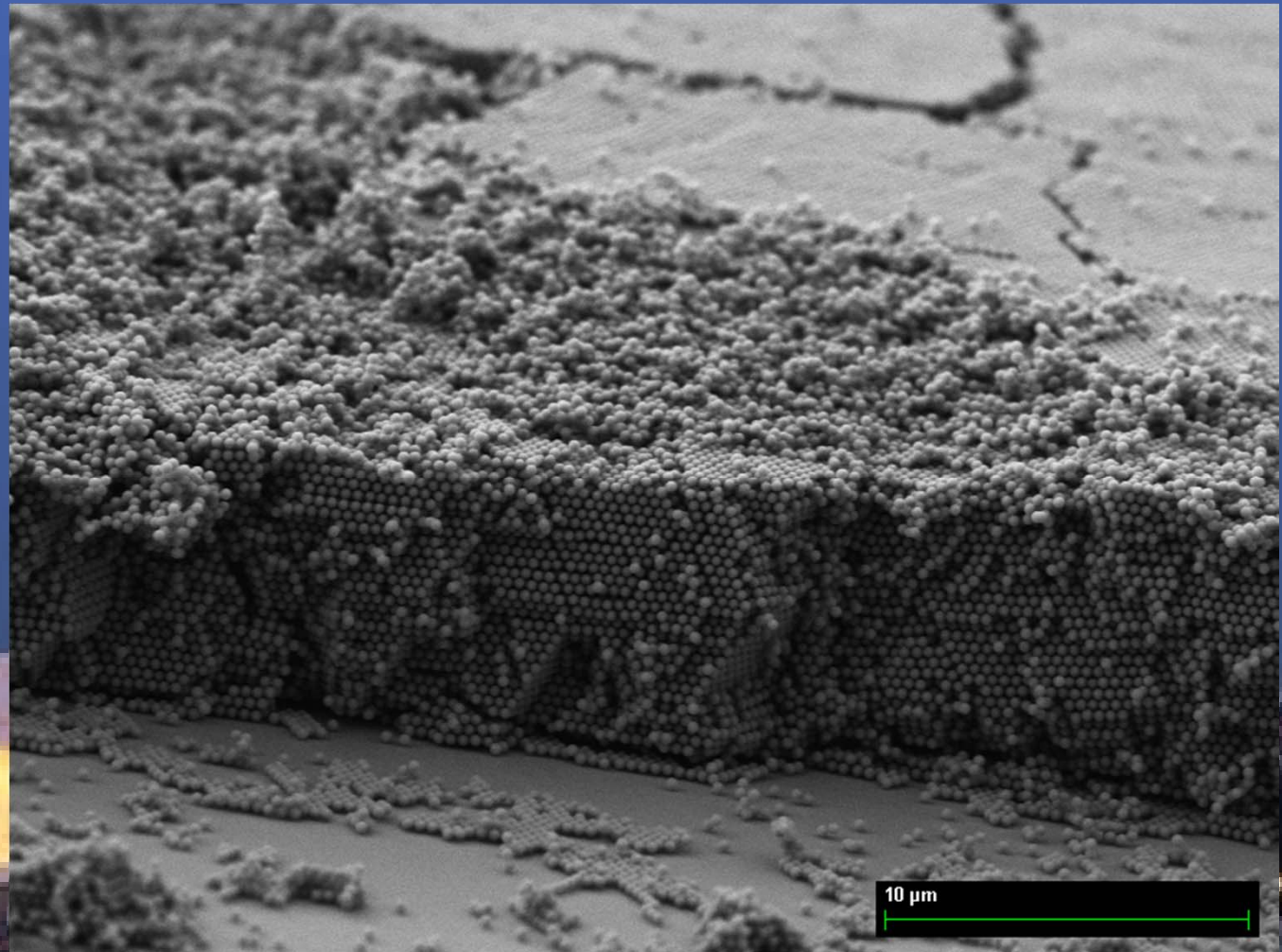


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Micrograph Title:
Nano Balls Tsunami

Description:
Nano silica balls self-organized on a silicon substrate. Be careful to the wave !



Magnification (3"x4" image): 2.83KX
Submitted by: L. Becerra & A. Maître

Instrument : Zeiss Supra 40
Affiliation: INSP – UPMC - CNRS

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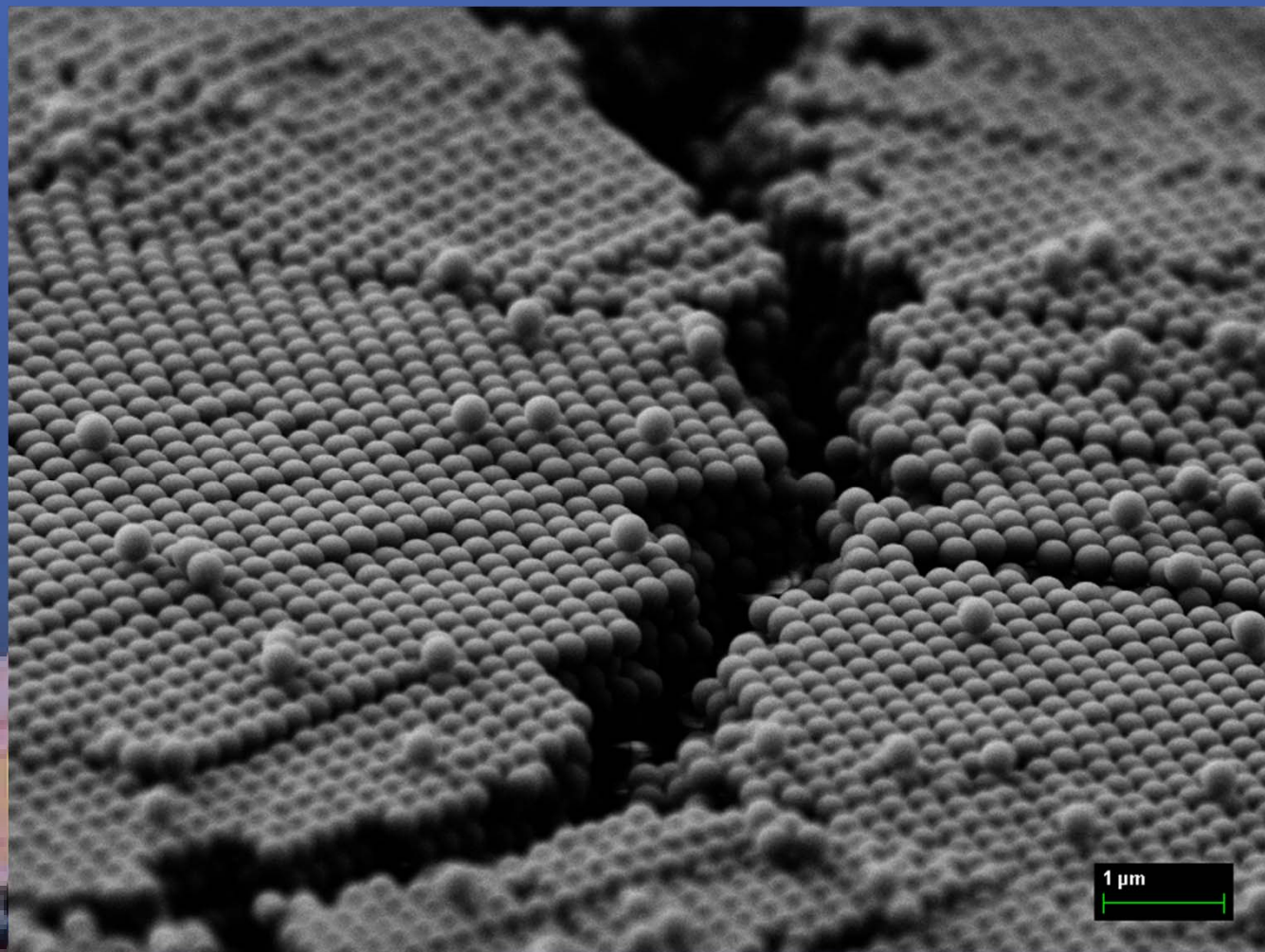
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Micrograph Title:
Micro Plate Tectonics

Description:
Nano silica balls self-organized on a silicon substrate.

A subduction or a divergence zone ?
This looks like to continental plates motion.



Magnification (3"x4" image): 9.33KX
Submitted by: L. Becerra & A. Maître

Instrument : Zeiss Supra 40
Affiliation: INSP – UPMC - CNRS

EIPBN

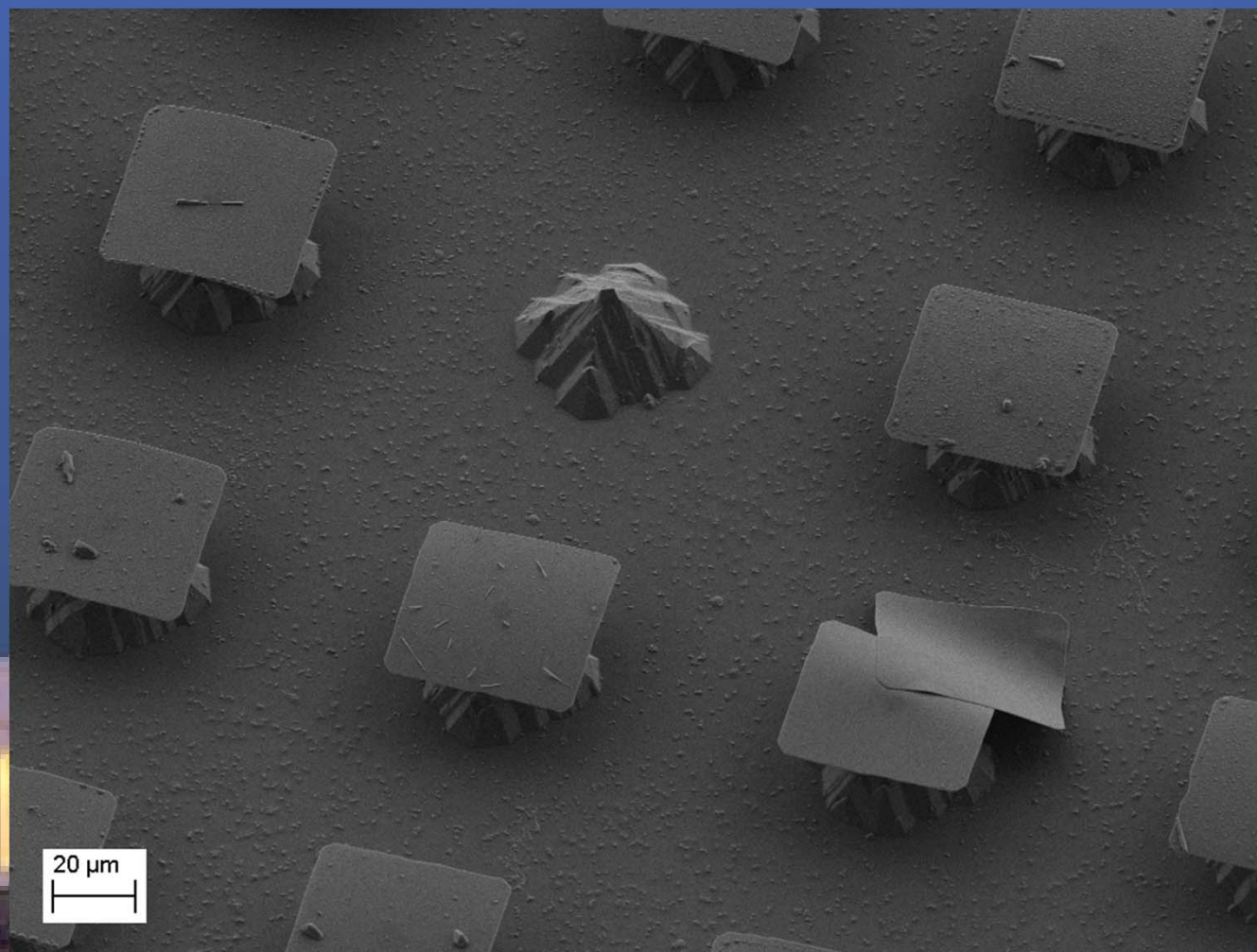


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Micrograph Title:
Can you give me back
my hat, please ?

Description:
A silicon micro-tips
network with a SiO_2
thin "hat" on top of
each tip.
One of these tips
stole the hat of his
neighbor.



Magnification (3"x4" image): 0.37KX
Submitted by: L. Becerra & L. Belliard

Instrument : Zeiss Supra 40
Affiliation: INSP – UPMC - CNRS

EIPBN

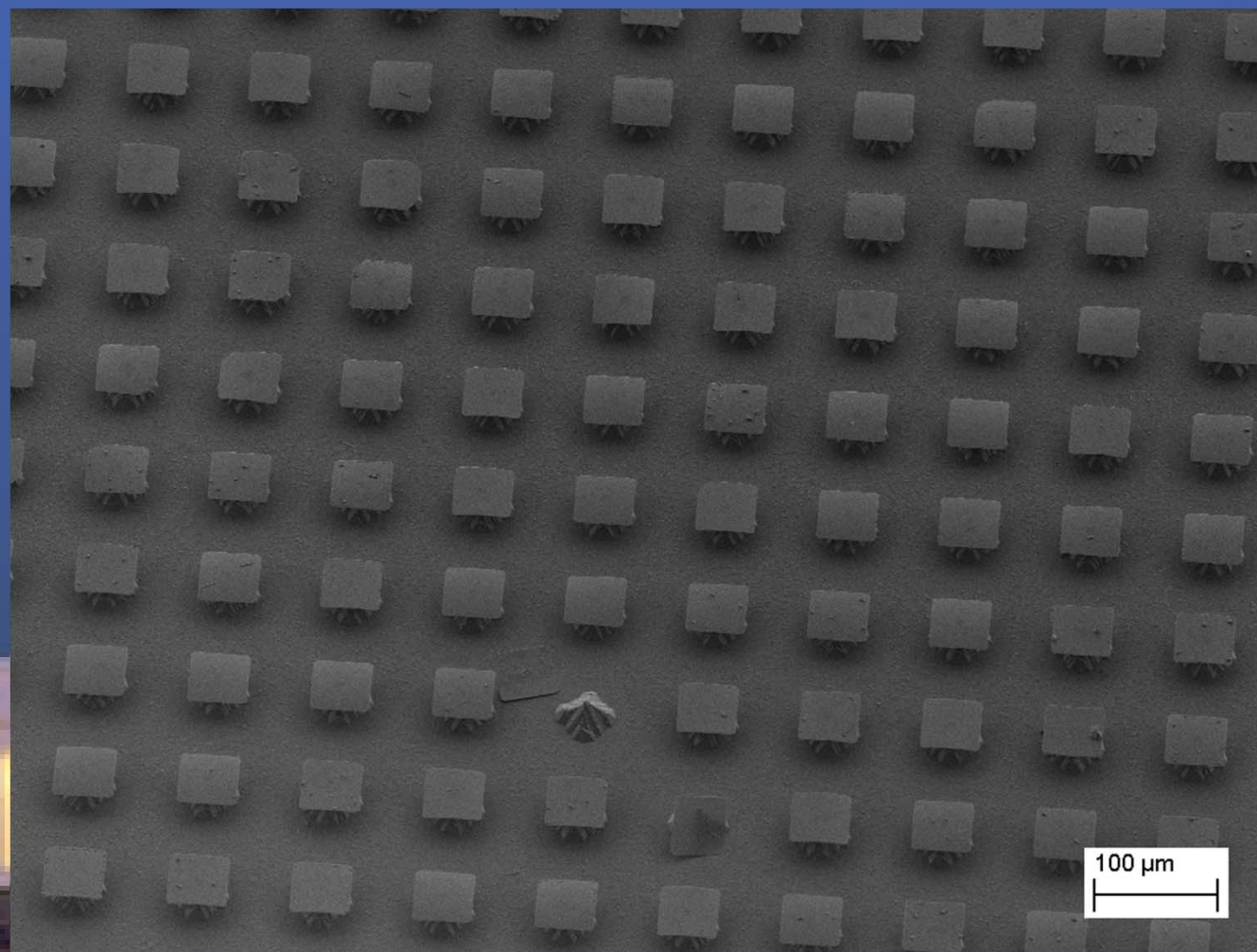


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Micrograph Title:
Where's Waldo ?

Description:
A silicon micro-tips network with a SiO_2 thin "hat" on top of each tip.
One of these tips (Waldo) lost his hat.

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Magnification (3"x4" image): 0.11KX
Submitted by: L. Becerra & L. Belliard

Instrument : Zeiss Supra 40
Affiliation: INSP – UPMC - CNRS

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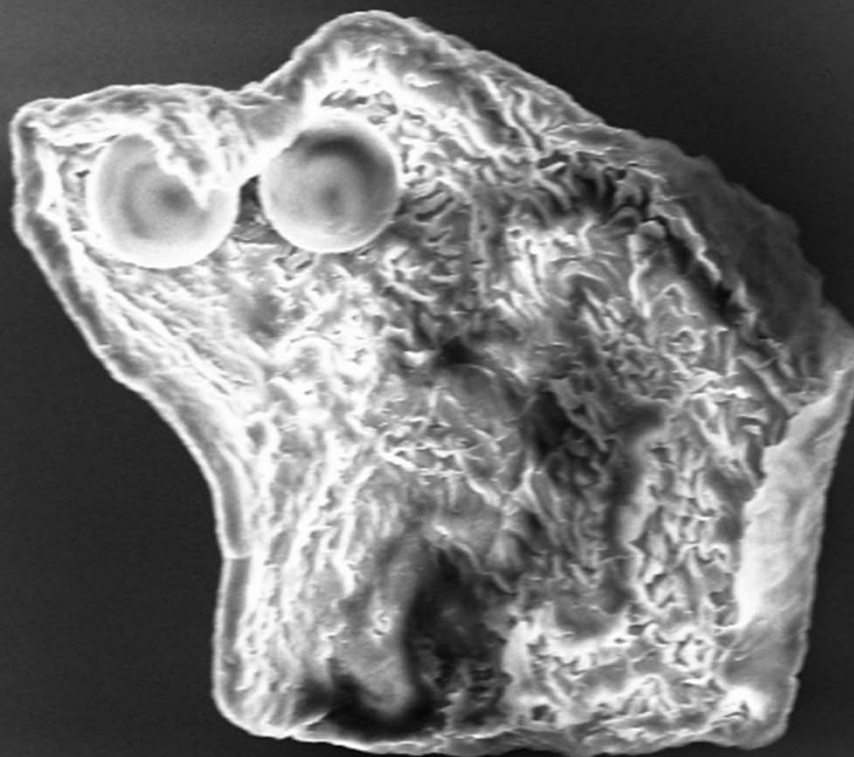
Micrograph Title:
Dusty Owl

Description:

Sometimes, a random piece of dust is just not so random – particularly, when you have been staring at that black and white screen for far too long...

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Isn't
SEMing
a
hoot?



10 um

Magnification (3"x4" image): 2,360X
Submitted by: Sarunya Bangsaruntip

Instrument : Zeiss Ultra SEM
Affiliation: IBM Watson Research Center

EIPBN



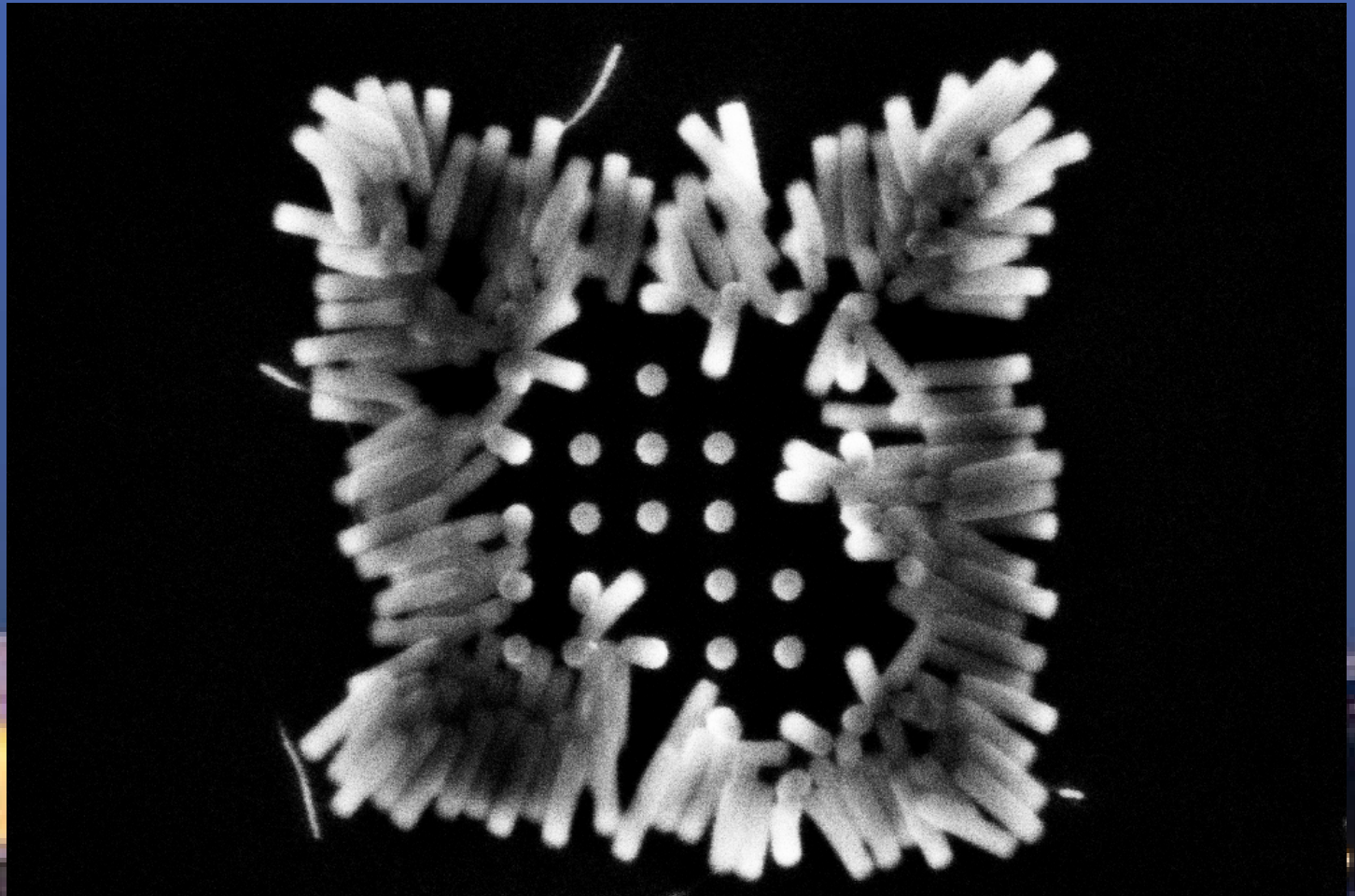
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Micrograph Title: Nano-protection

Description:

Exposure of square array of 75nm HSQ dots (with high aspect ratio) using electron beam lithography at a certain causes external pillars to collapse which act as protection for pillars located in the center.

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Magnification (3"x4" image): 129.17KX

Instrument : Zeiss Supra VP55

Submitted by: Waiz Karim
Institute, Switzerland

Affiliation: ETH Zurich and Paul Scherrer

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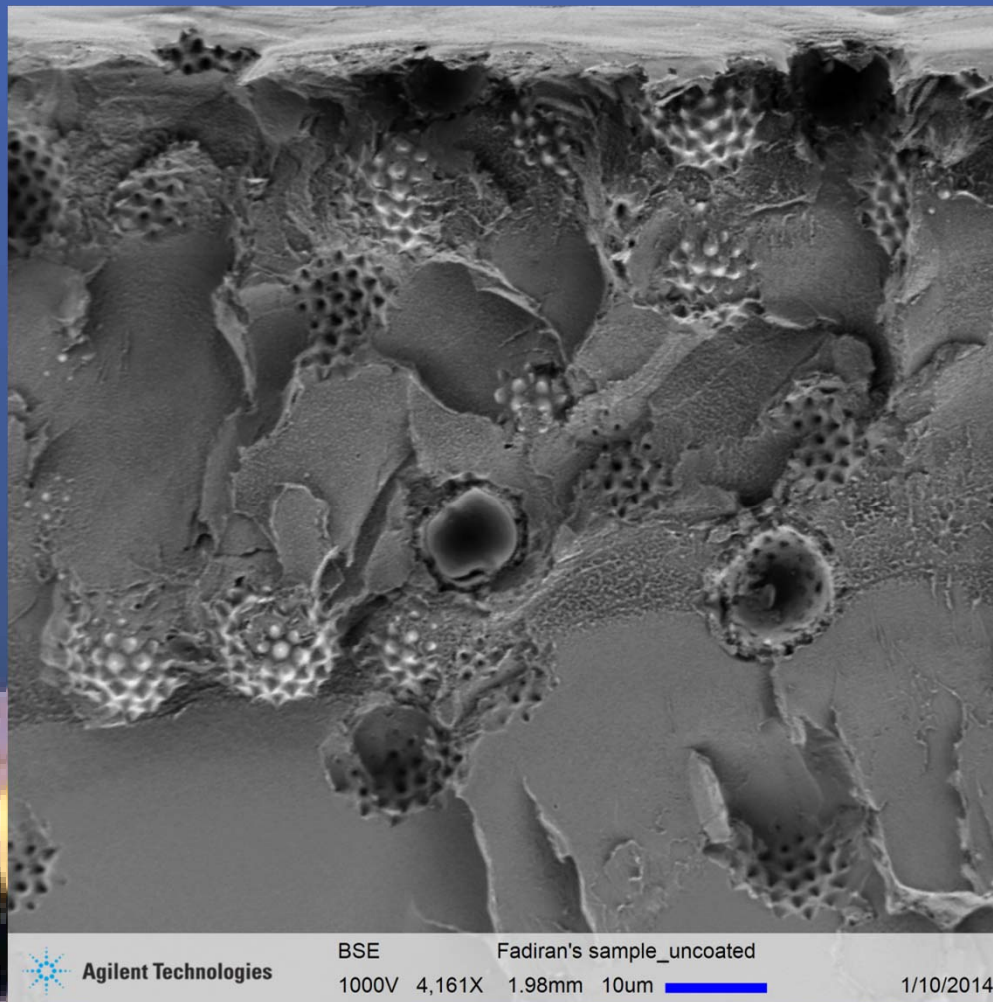


2014 EIPBN MicroGraph Contest

Micrograph Title:
Where is the fox?

Description:
SEM image of uncoated
Short Ragweed Pollen
embedded in polymerized
polyvinyl acetate matrix in
the cross section view.

Sample courtesy of
Oluwatimilehin Fadiran
and Dr. J. Carson
Meredith, Georgia Institute
of Technology.



Magnification (3"x4" image): 2080X

Instrument : Agilent 8500 FE-SEM

Submitted by: Jining Xie, James Spallas, Larry Muray

Affiliation: Agilent Technologies

EIPBN

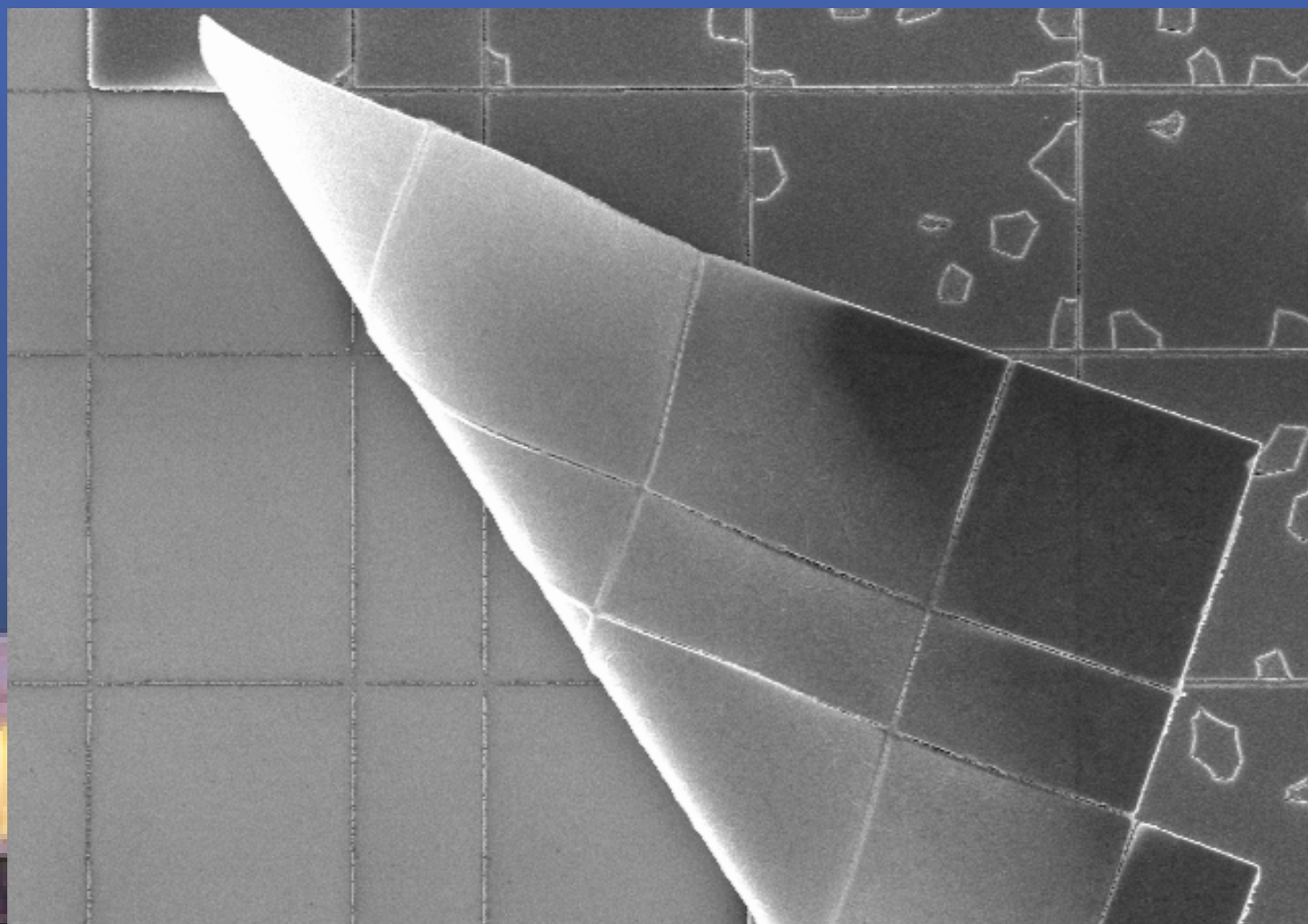


WASHINGTON DC 2014

Micrograph Title:
De Stijl (The Style)

Description:
Gold nanolines after
incomplete lift-off

2014 EIPBN MicroGraph Contest



5.0kV 5.9mm x6.00k SE(U) 9/23/2013 18:42

5.00um

Magnification (3"x4" image): 6KX
Submitted by: Haogang Cai

Instrument : Hitachi 4700
Affiliation: Columbia University

EIPBN

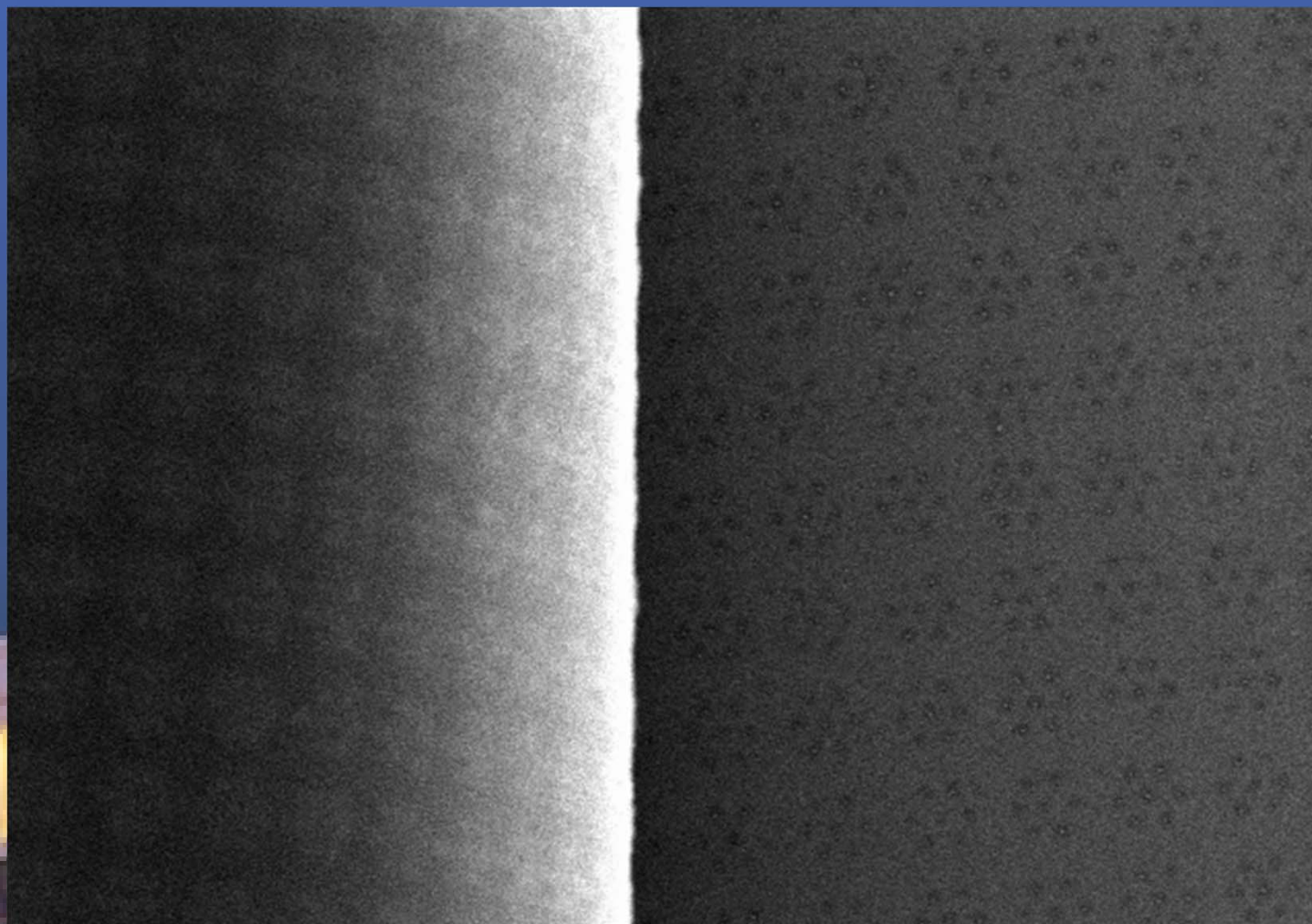


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Nanobook

Description:
Gold nanodot arrays
are revealed when a
metal mask is turned
over after lift-off



5.0kV 4.8mm x45.0k SE(U)

1.00um

Magnification (3"x4" image): 45KX
Submitted by: Haogang Cai

Instrument : Hitachi 4700
Affiliation: Columbia University

EIPBN

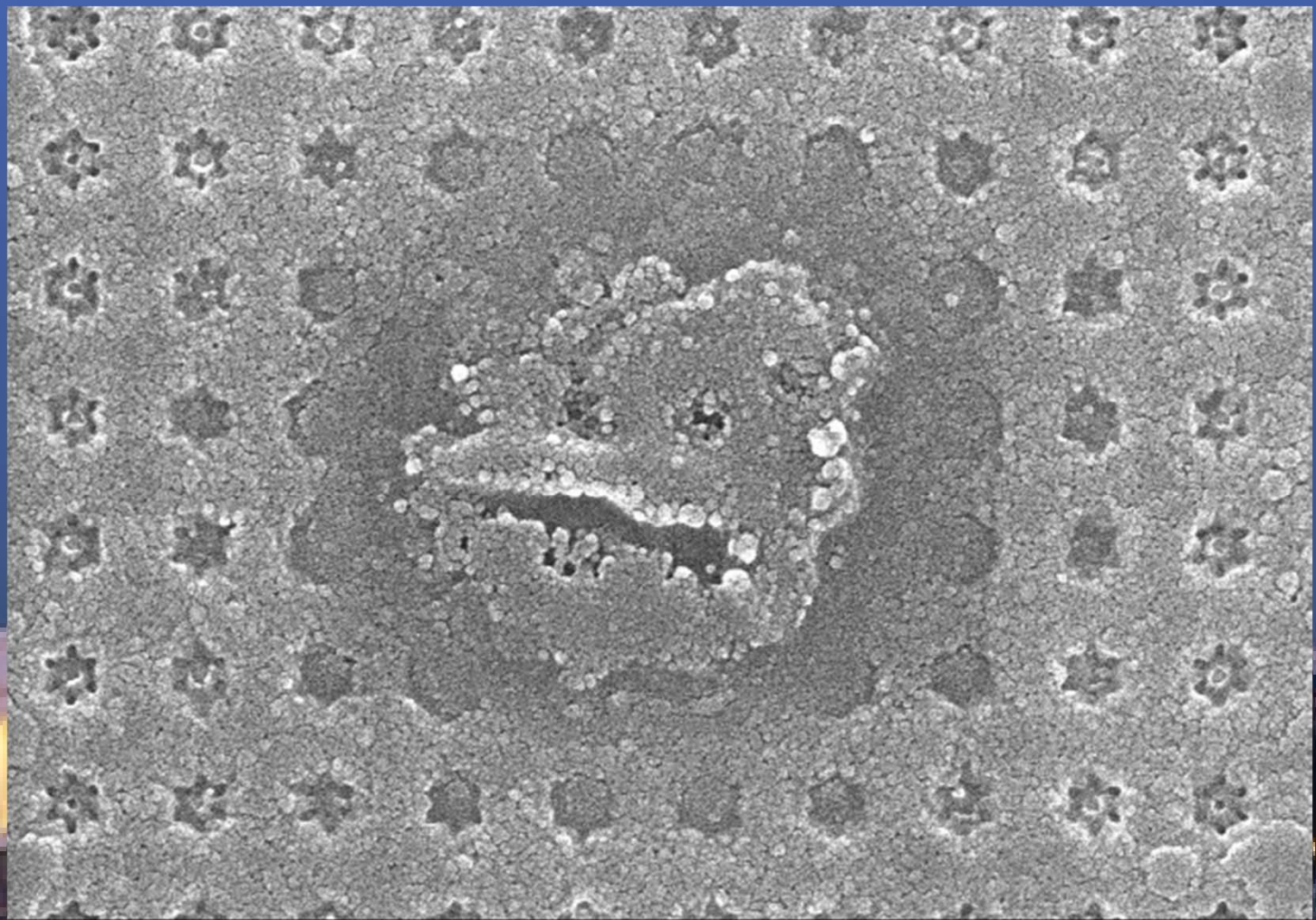


WASHINGTON DC 2014

Micrograph Title:
; (

Description:
A defective area in
Nanoimprinted PMMA
(with Ti on top)

2014 EIPBN MicroGraph Contest



5.0kV 4.8mm x45.0k SE(U)

1.00um

Magnification (3"x4" image): 45KX
Submitted by: Haogang Cai

Instrument : Hitachi 4700
Affiliation: Columbia University

EIPBN

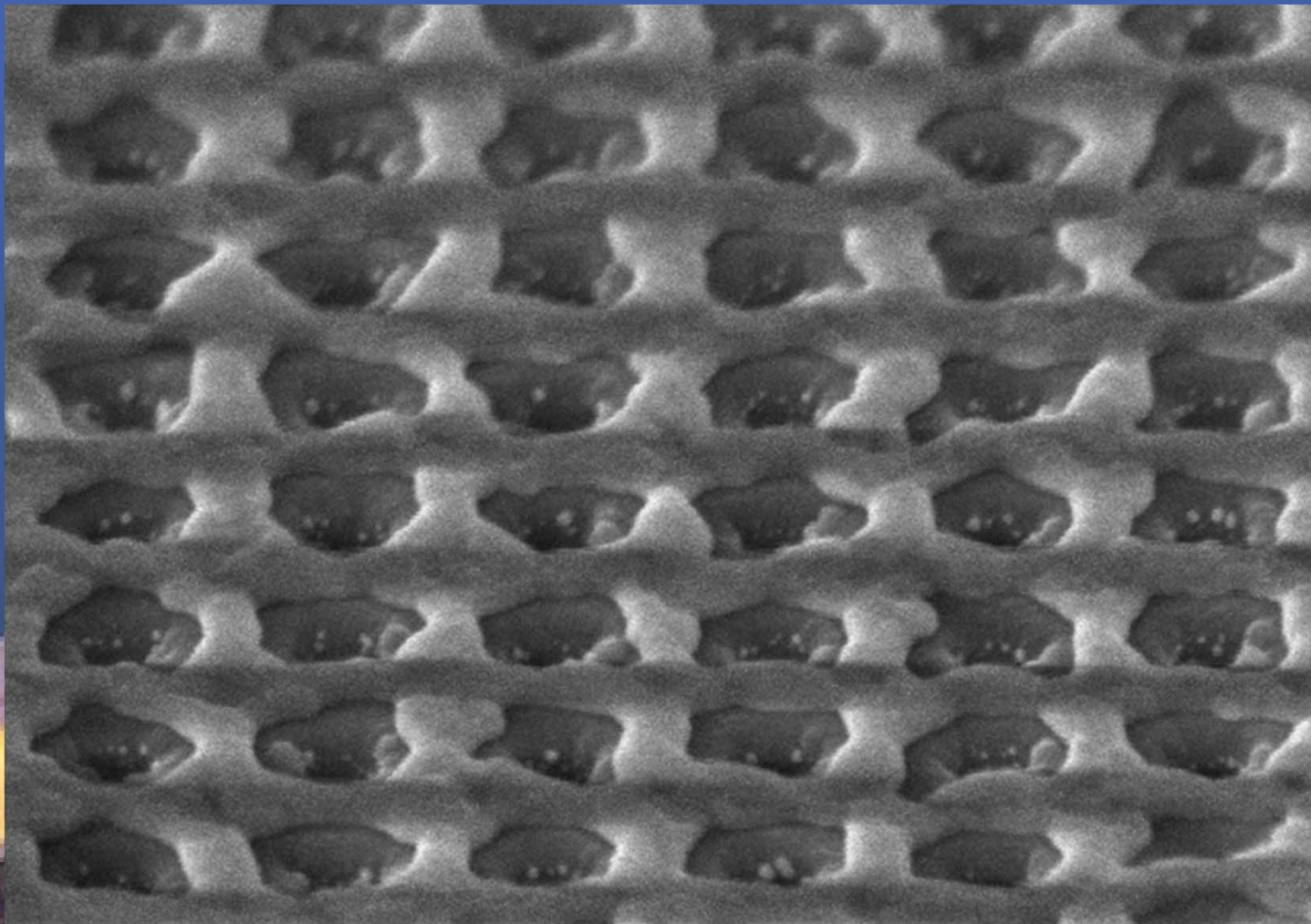


WASHINGTON DC 2014

Micrograph Title:
Nano lattice-top pie

Description:
Gold evaporated on
PMMA with
nanoimprinted holes

2014 EIPBN MicroGraph Contest



5.0kV 5.8mm x100k SE(M)

500nm

Magnification (3"x4" image): 100KX
Submitted by: Haogang Cai

Instrument : Hitachi 4700
Affiliation: Columbia University

EIPBN

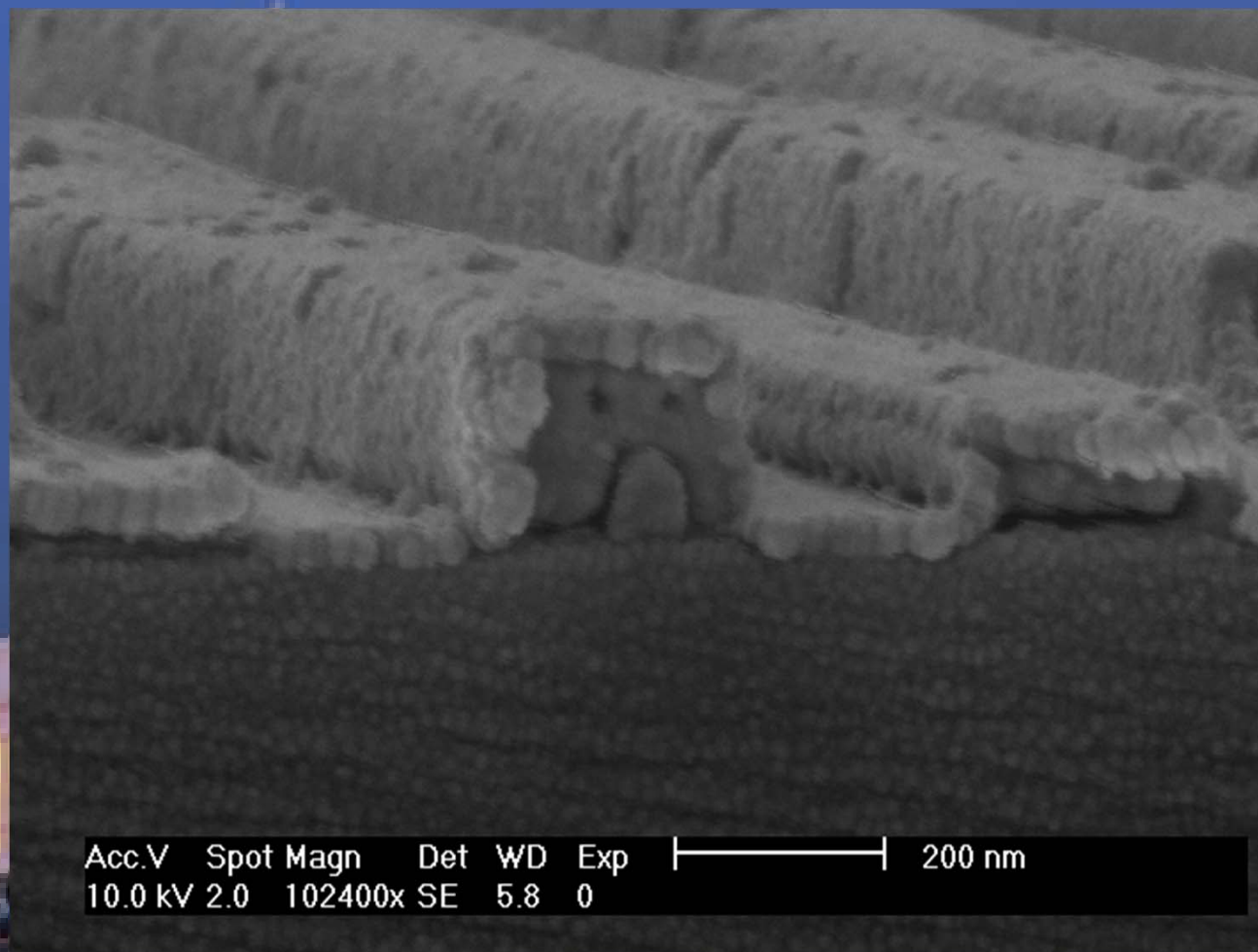


WASHINGTON DC 2014

Micrograph Title:
The United States
Founding Father
of Nano

Description:
Imprint into DiBCP on
silicon substrate by
Si-stamp. The cavity
height and width are
200nm. A ~50nm Au
layer was sputtered
on the top.

2014 EIPBN MicroGraph Contest



Magnification (3"x4" image): 10KX
Submitted by: Christian Steinberg

Instrument : FEI
Affiliation: University of Wuppertal

EIPBN

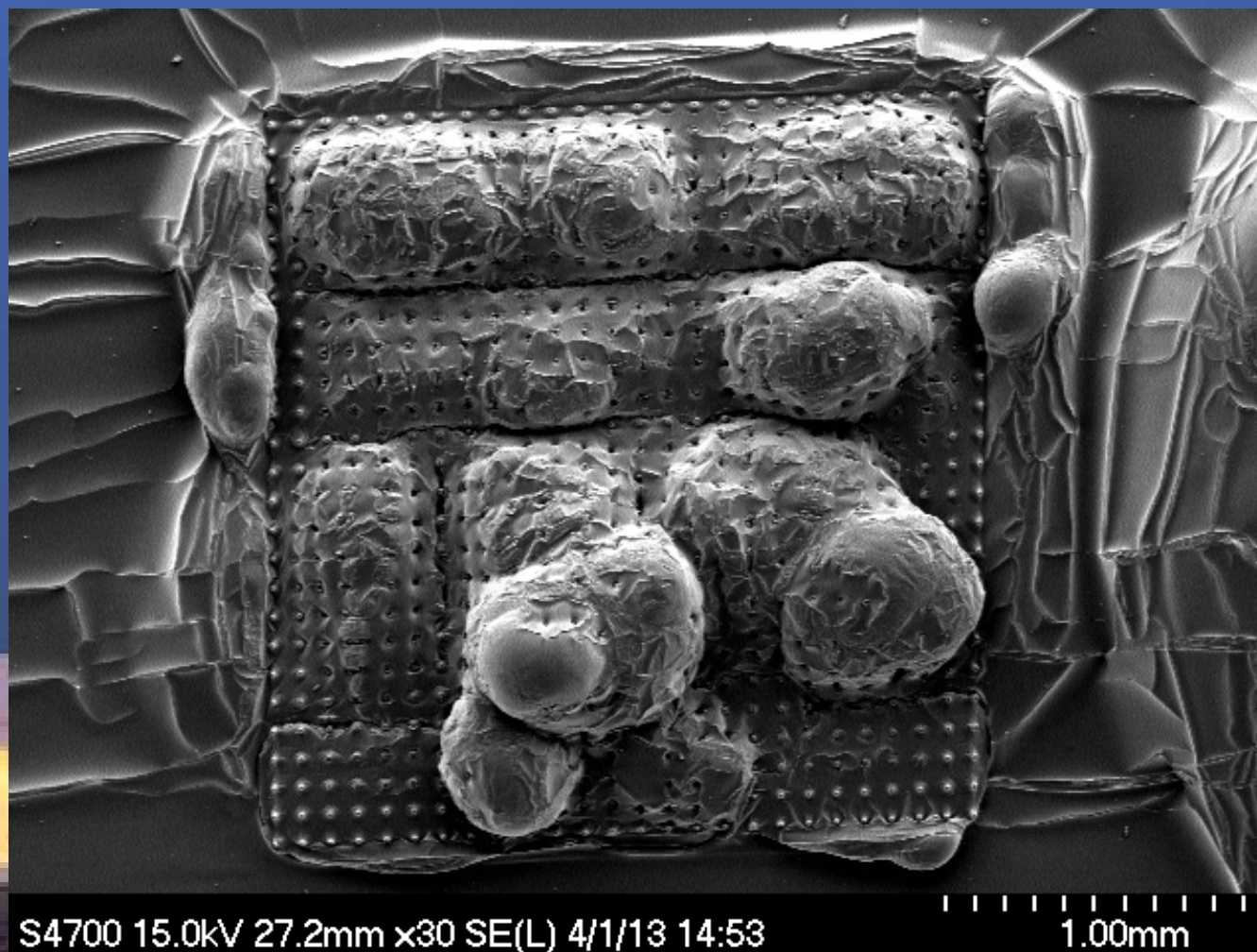


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Bacteria

Description:
SEM image of
microelectrode array.
In this image you can
see that the resist is
outgassing causing
bubbles.



Magnification (3"x4" image): 30X
Submitted by: James Owen & Bill Owen

Instrument : Hitachi S-4700 SEM
Affiliation: Zyvex Labs

EIPBN

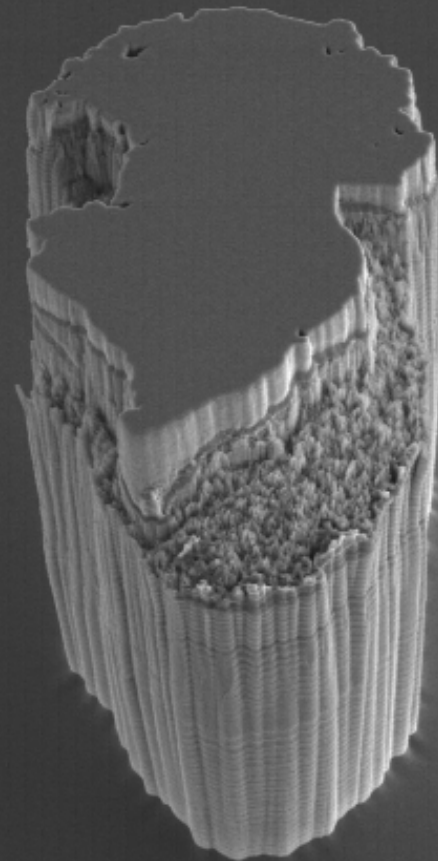


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Miniature Ireland

Description:
SEM image of silicon microelectrode array (between the needles) where the silicon did not etch causing a defect.



15.0kV x350 85.7µm

Magnification (3"x4" image): 350X
Submitted by: Josh Ballard & Bill Owen

Instrument : Hitachi 2500 SEM
Affiliation: Zyvex Labs

EIPBN



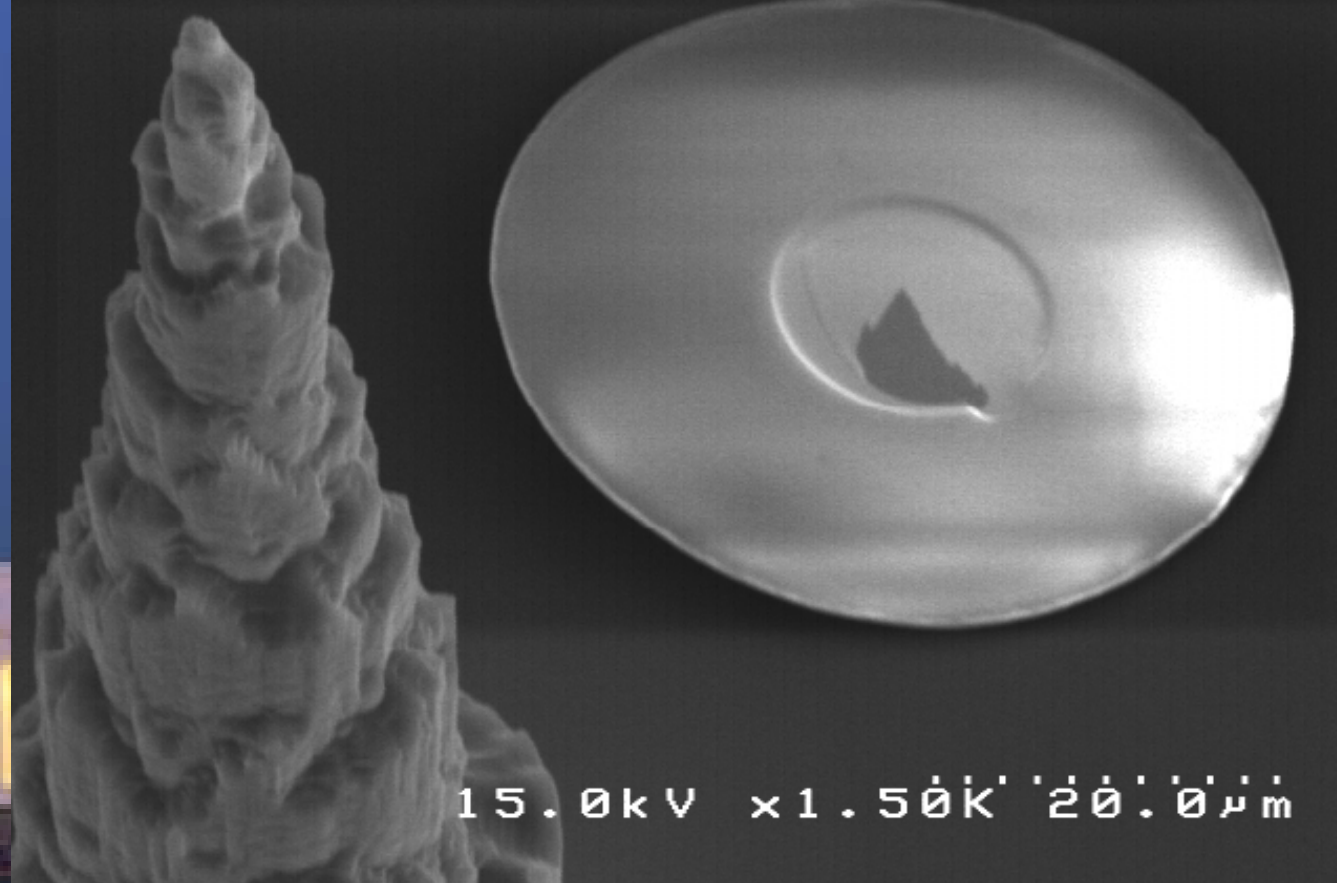
WASHINGTON DC 2014

Micrograph Title:
Rising Moon or
Flying Saucer?

Description:
SEM image of a
single needle of a
silicon
microelectrode array
with the moon (resist)
rising.

2014 EIPBN MicroGraph Contest

WAFER 7 1312
TILT 30



Magnification (3"x4" image): 1.5KX
Submitted by: James Owen & Bill Owen

Instrument : Hitachi 2500 SEM
Affiliation: Zyvex Labs

EIPBN

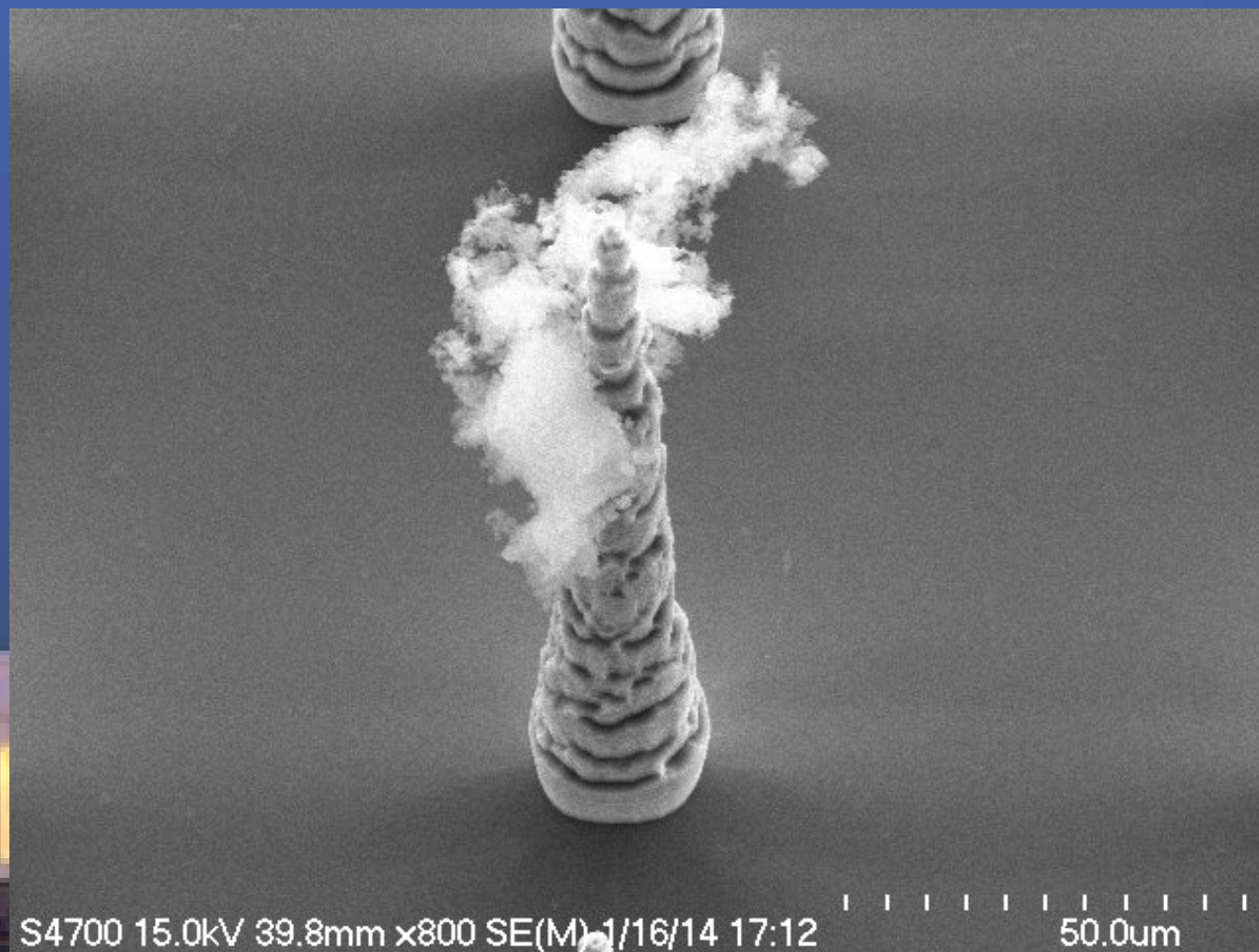


WASHINGTON DC 2014

Micrograph Title:
Tut Tut It Looks
Like Rain

Description:
SEM image of a
single silicon needle
of a microelectrode
array with debris
(clouds).

2014 EIPBN MicroGraph Contest



Magnification (3"x4" image): 800X
Submitted by: Josh Ballard & Bill Owen

Instrument : Hitachi S-4700 SEM
Affiliation: Zyvex Labs

EIPBN

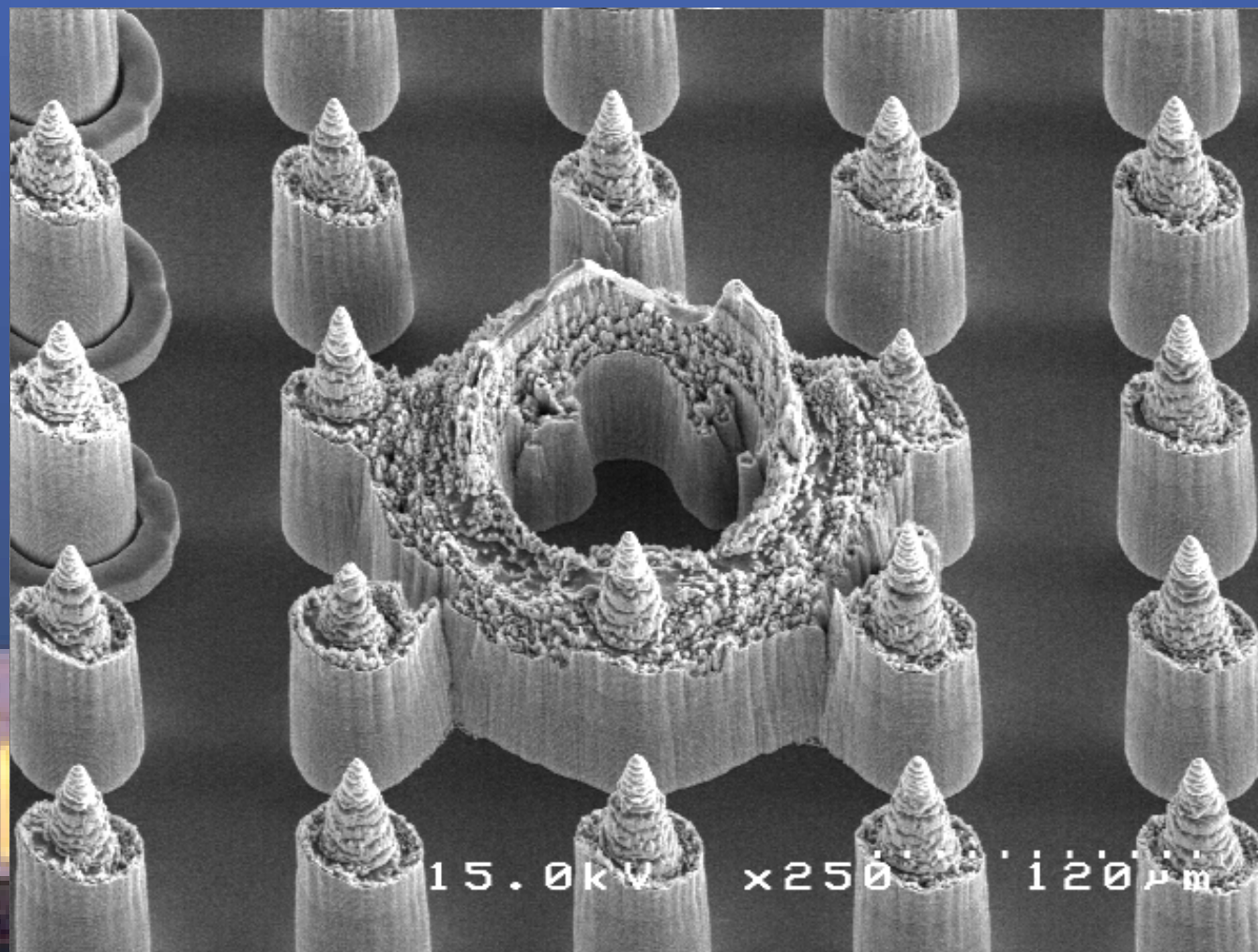


WASHINGTON DC 2014

Micrograph Title:
The Hole

Description:
SEM image of silicon
needles of a
microelectrode array
where something
went wrong!

2014 EIPBN MicroGraph Contest



Magnification (3"x4" image): 250X
Submitted by: James Owen & Bill Owen

Instrument : Hitachi S-4700 SEM
Affiliation: Zyvex Labs

EIPBN



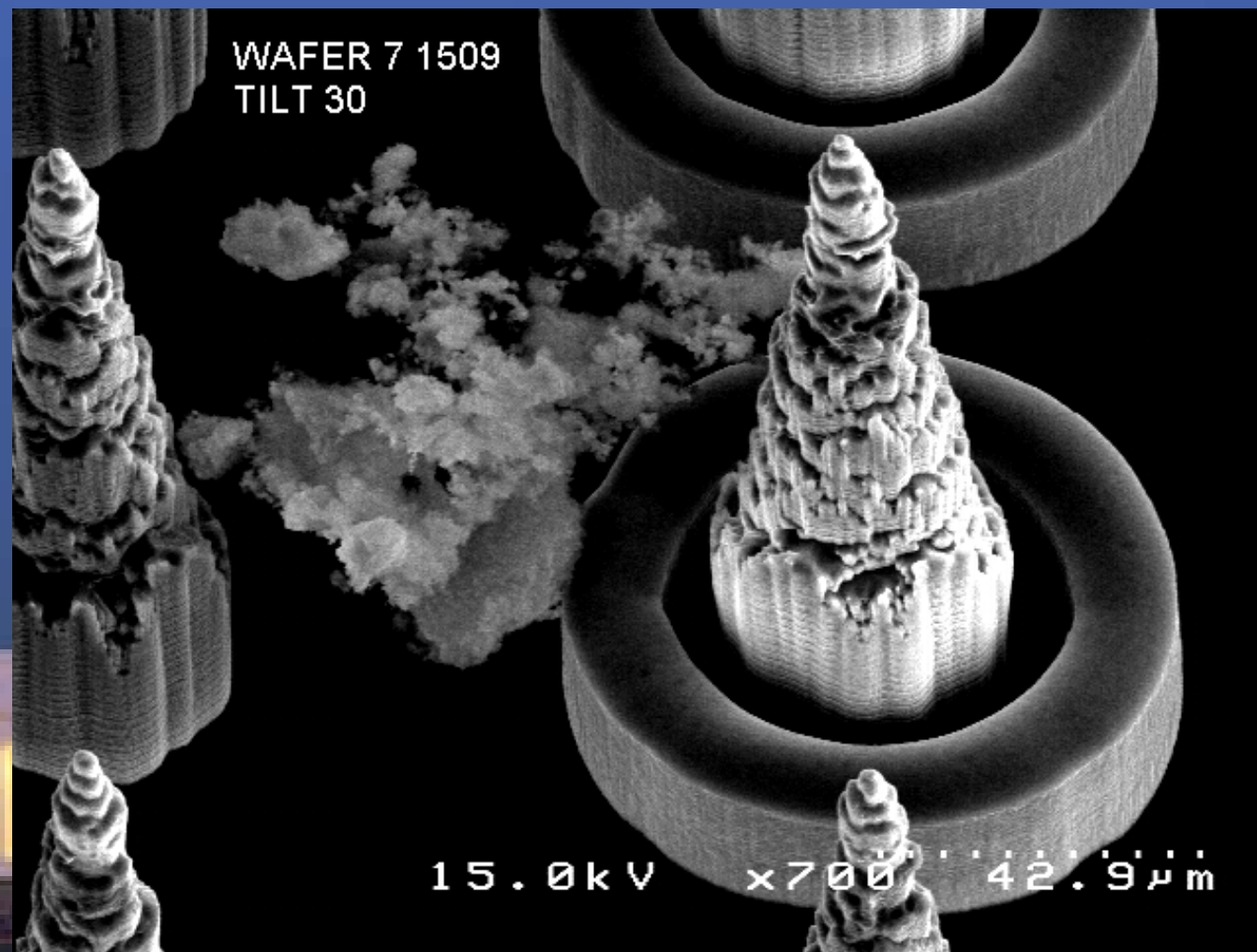
WASHINGTON DC 2014

Micrograph Title:
Clouds

Description:
SEM image of silicon
needles of a
microelectrode array
where more
fuzz/debris is moving
in from the West.



2014 EIPBN MicroGraph Contest



Magnification (3"x4" image): 700X
Submitted by: Josh Ballard & Bill Owen

Instrument : Hitachi 2500 SEM
Affiliation: Zyvex Labs

EIPBN



WASHINGTON DC 2014

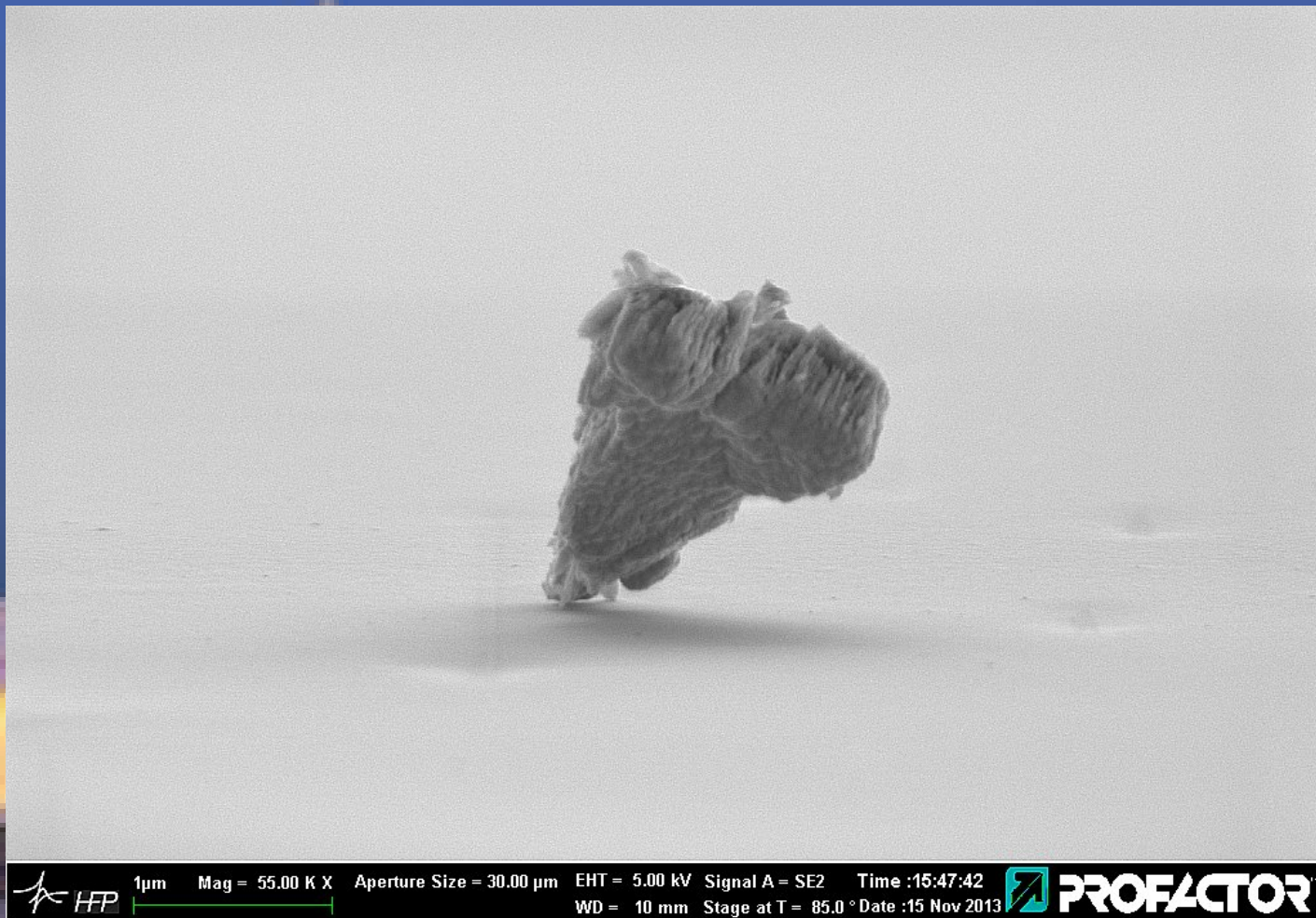
Micrograph Title:

Dust dancer

Description:

A dust particle defies gravity and dances on top an unfortunate nanostructured sample.

2014 EIPBN MicroGraph Contest



1µm

Mag = 55.00 K X

Aperture Size = 30.00 µm

EHT = 5.00 kV

Signal A = SE2

Time :15:47:42



WD = 10 mm Stage at T = 85.0 ° Date :15 Nov 2013

Magnification (3"x4" image): 55.0K X

Submitted by: Lukas Häusler

Instrument : Zeiss Leo SUPRA 35

Affiliation: PROFACTOR GmbH

EIPBN



WASHINGTON DC 2014

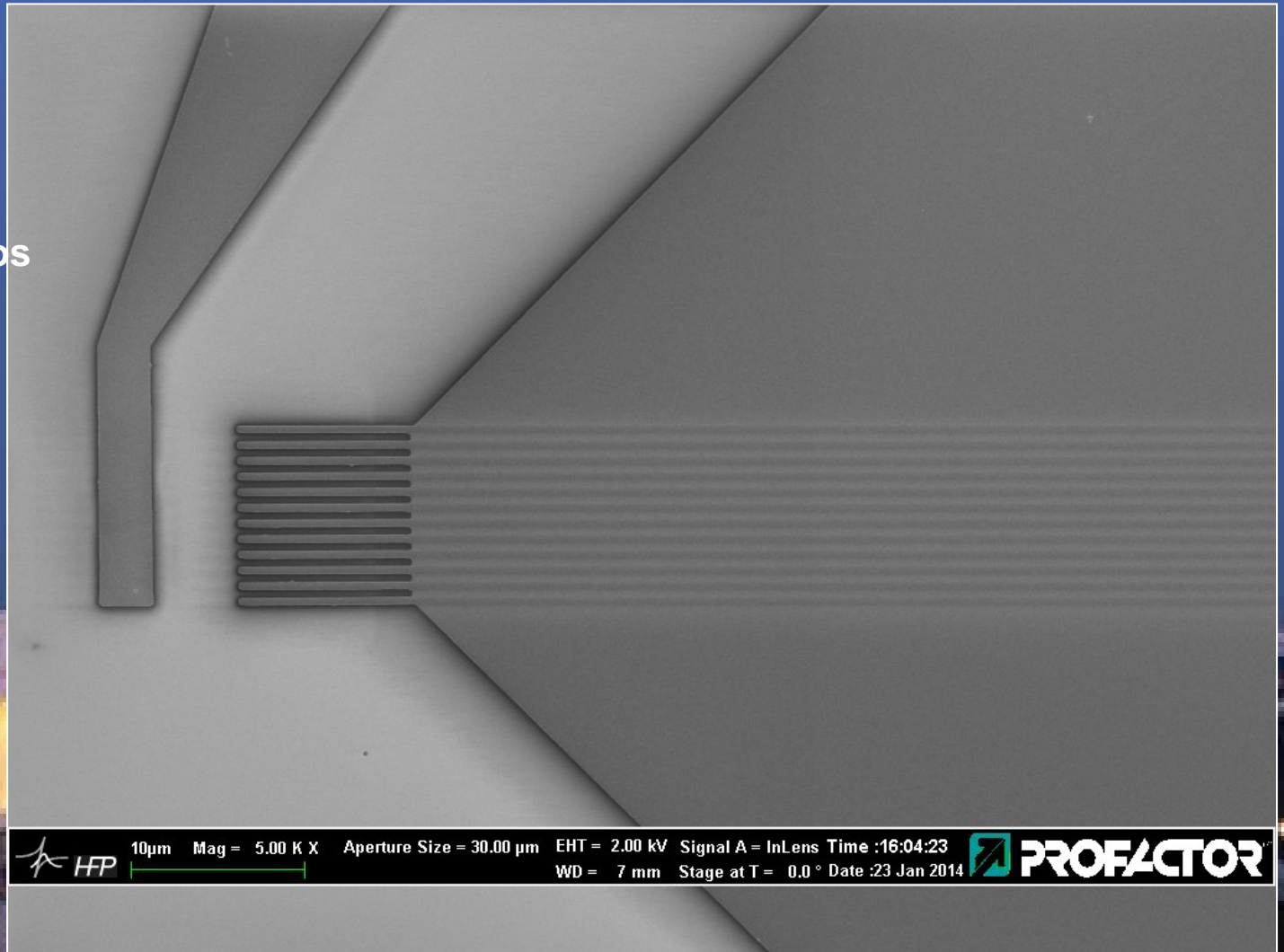
Micrograph Title:

Guitarra des los μ m-os

Description:

Charging effects during SEM imaging of gold electrodes accounted for this musical effect.

2014 EIPBN MicroGraph Contest



10 μ m

Mag = 5.00 K X

Aperture Size = 30.00 μ m

EHT = 2.00 kV

Signal A = InLens Time :16:04:23

WD = 7 mm

Stage at T = 0.0 ° Date :23 Jan 2014



Magnification (3"x4" image): 5.0K X

Submitted by: Lukas Häusler

Instrument : Zeiss Leo SUPRA 35

Affiliation: PROFACTOR GmbH

EIPBN

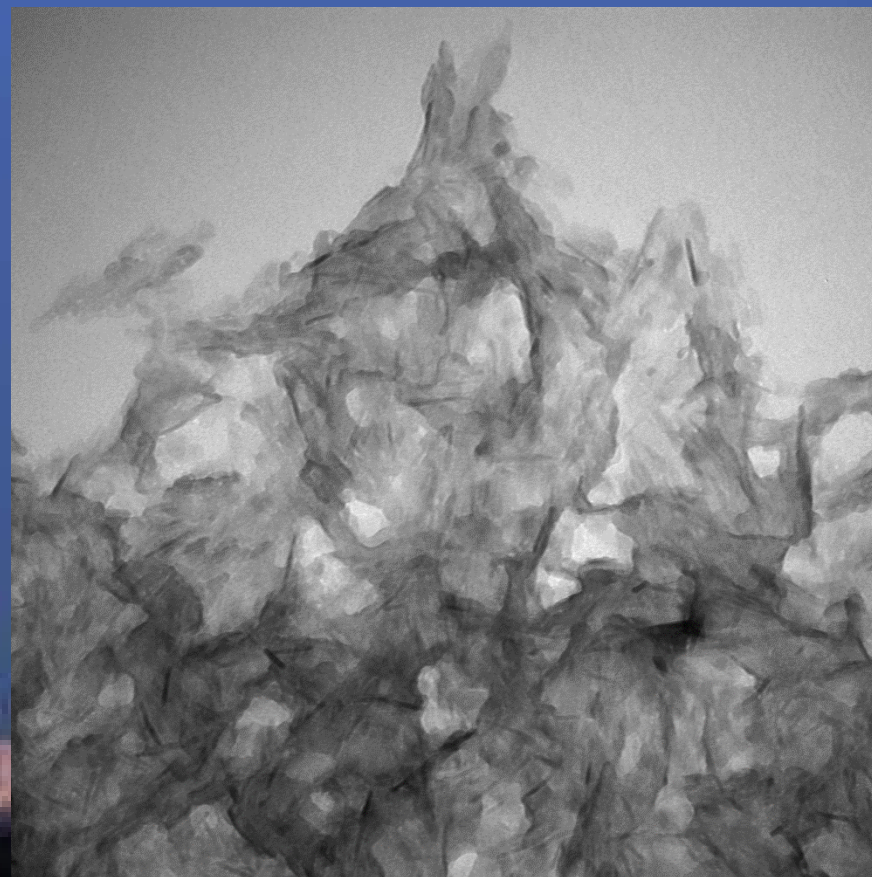


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Watercolor on
Canvas

Description:
Hydroxyapatite
Nanoparticles
Synthesized at 45
Degrees Celsius and
Dispersed with
Citrate



45C 0Fe Cit 4.tif
45C 0 Fe cit
Print Mag: 78900x @ 51 mm
14:14 11/06/13
TEM Mode: Imaging
Microscopist: Mpjd

100 nm
HV=75kV
Direct Mag: 150000x
University of Montana

Magnification (3"x4" image): 127KX
Submitted by: Jessica Andriolo

Instrument : Hitachi TEM 4500
Affiliation: Montana Tech

EIPBN

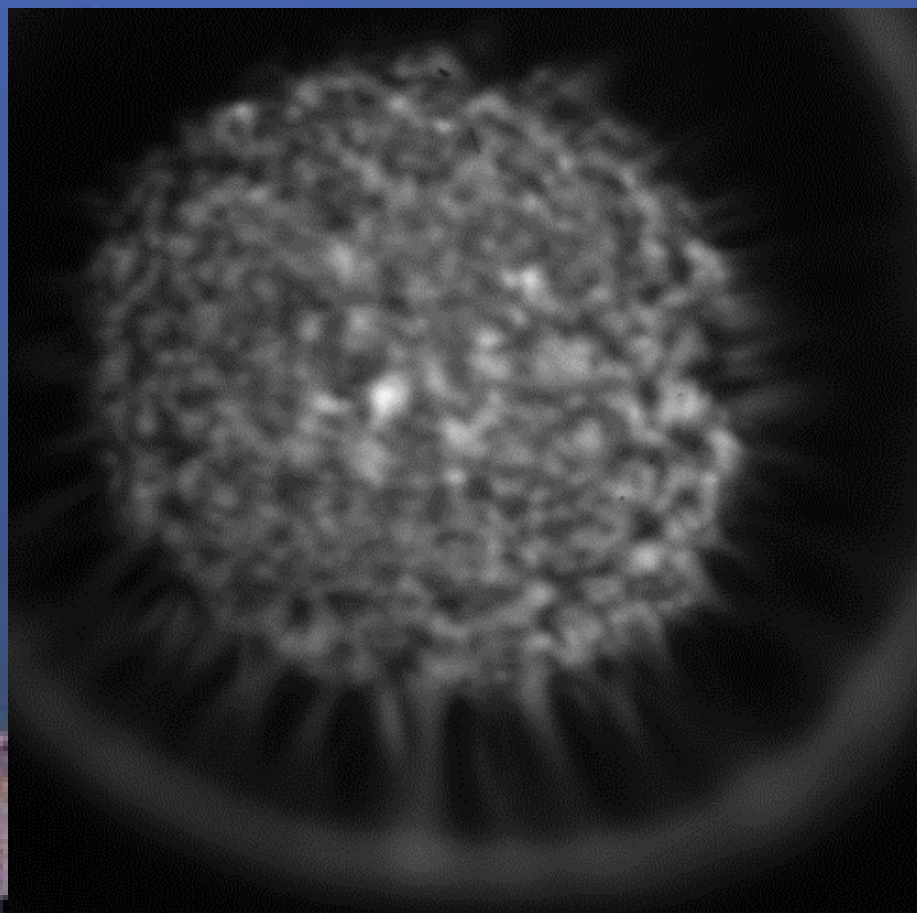


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Miniature Fuzz Ball

Description:
Electron emission
image of Yttria
particles on tantalum



Magnification (3"x4" image): 50X
Submitted by: Alan D. Brodie

Instrument : KLA-Tencor Test Stand
Affiliation: KLA-Tencor

EIPBN

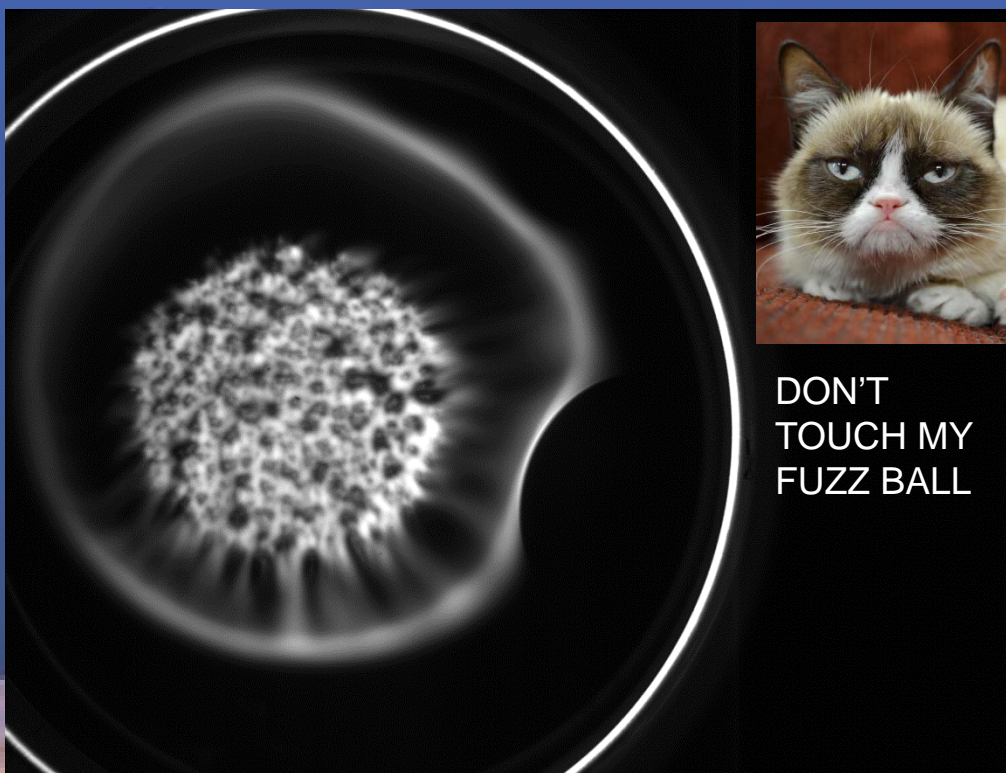


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Miniature Fuzz Ball #2

Description:
Electron emission
image of Yttria
particles on tantalum



DON'T
TOUCH MY
FUZZ BALL

Magnification (3"x4" image): 50X
Submitted by: Alan D. Brodie

Instrument : KLA-Tencor Test Stand
Affiliation: KLA-Tencor

EIPBN

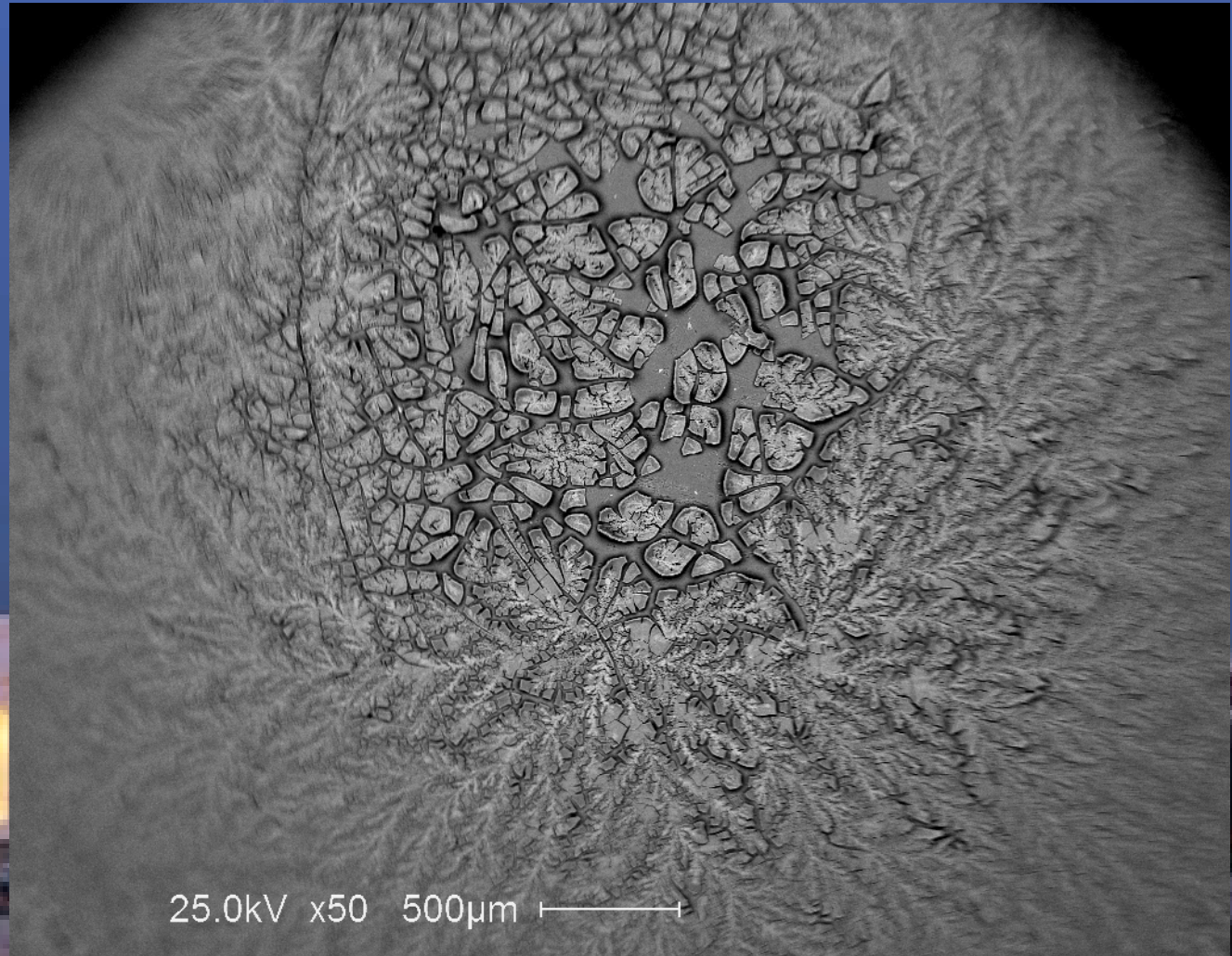


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Global Warming

Description:
Hydroxyapatite
Nanoparticles
Synthesized at 5
Degrees Celsius, Iron
Doped, and
Dispersed with
Citrate



Magnification (3"x4" image): 25X

Submitted by: Jessica Andriolo

**Instrument : Leo 143 VP SEM-EDS
EDAX Apollo 40**

Affiliation: Montana Tech

EIPBN

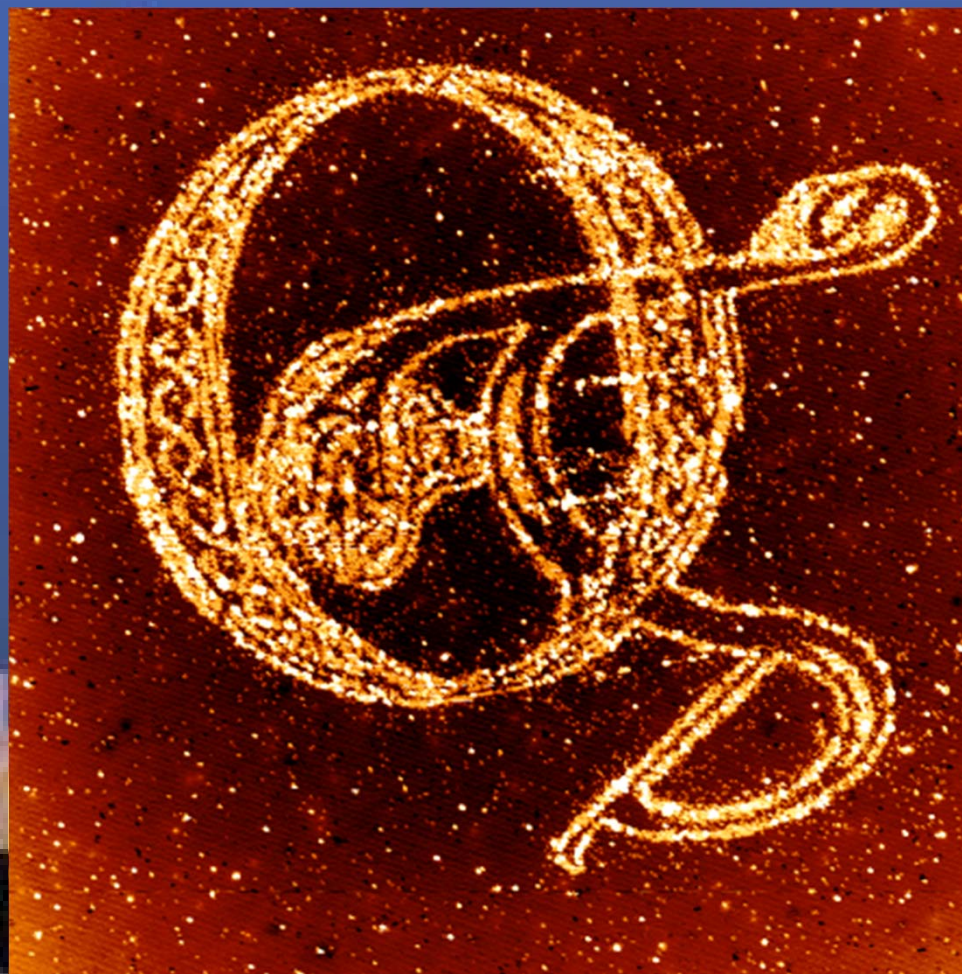


WASHINGTON DC 2014

**Golden Illuminated
Letters from the
Book of Nano-
Kells**

**Celtic Knotwork drawn
using STM
Lithography from a
500 x 500 pixel bitmap.
1 px = 7.68 Å**

2014 EIPBN MicroGraph Contest



**Magnification (3"x4" image): 350KX
Submitted by: James Owen**

**Instrument : (SCS)
Affiliation: Zyvex Labs**

EIPBN

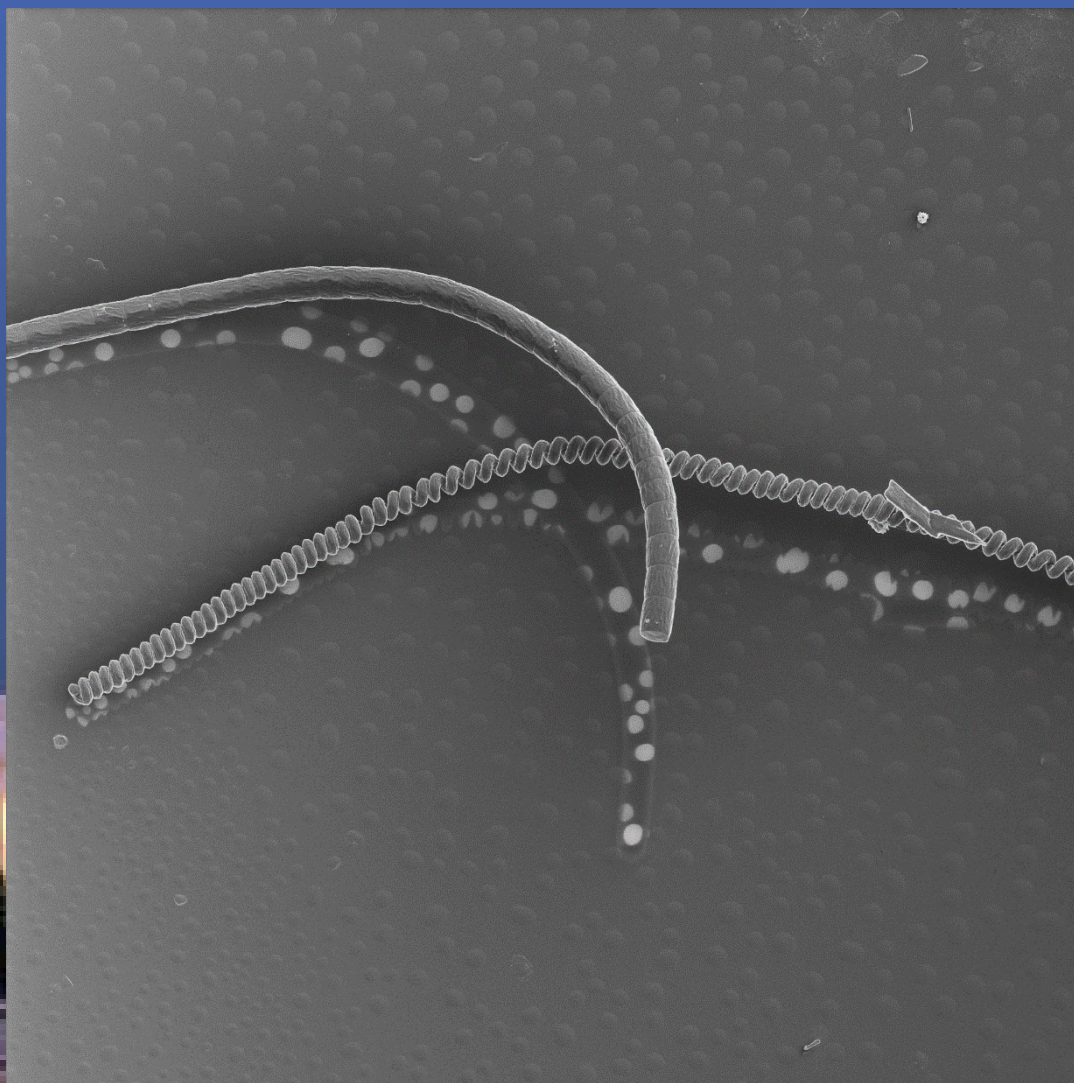


WASHINGTON DC 2014

Micrograph Title:
Shadow cross

Description:
Helium ion Image of
cyano-bacteria using
electron flood gun for
charge compensation

2014 EIPBN MicroGraph Contest



Magnification (3"x4" image): 1.143KX
Submitted by: Eva Mutunga & Kate Klein

Instrument : Carl Zeiss Orion
Affiliation: NIST / UDC

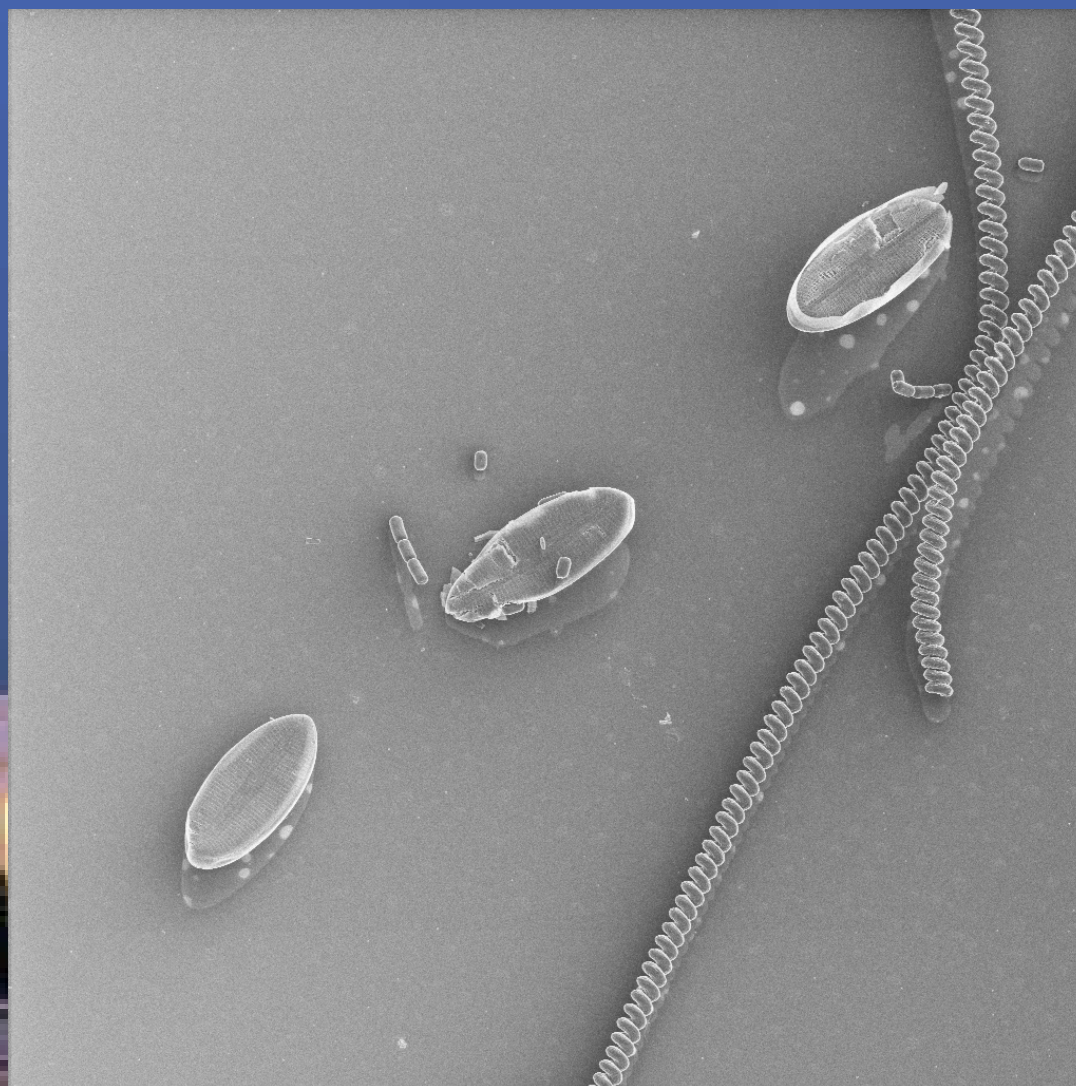
EIPBN



WASHINGTON DC 2014

Micrograph Title:
And then there
were three...

Description:
Helium ion Image of
cyano-bacteria using
electron flood gun for
charge compensation



Magnification (3"x4" image): 1.143KX
Submitted by: Eva Mutunga & Kate Klein

Instrument : Carl Zeiss Orion
Affiliation: NIST / UDC

EIPBN



2014 EIPBN MicroGraph Contest

Micrograph Title:

Continental Drift

Description:

Accelerated video showing the result of an extremely high, localized dose of helium into a silicon wafer, covered with a zirconium dioxide crust.

SORRY THE VIDEO DOSN'T WORK
IN PDF. PLEASE SEE VIDEO ON
WEBSITE.

Magnification: 333kx

**Submitted by: John Notte,
Shawn McVey, Sybren Sijbrandij**

Instrument: Zeiss Orion HIM

Affiliation: Carl Zeiss Microscopy, LLC

EIPBN



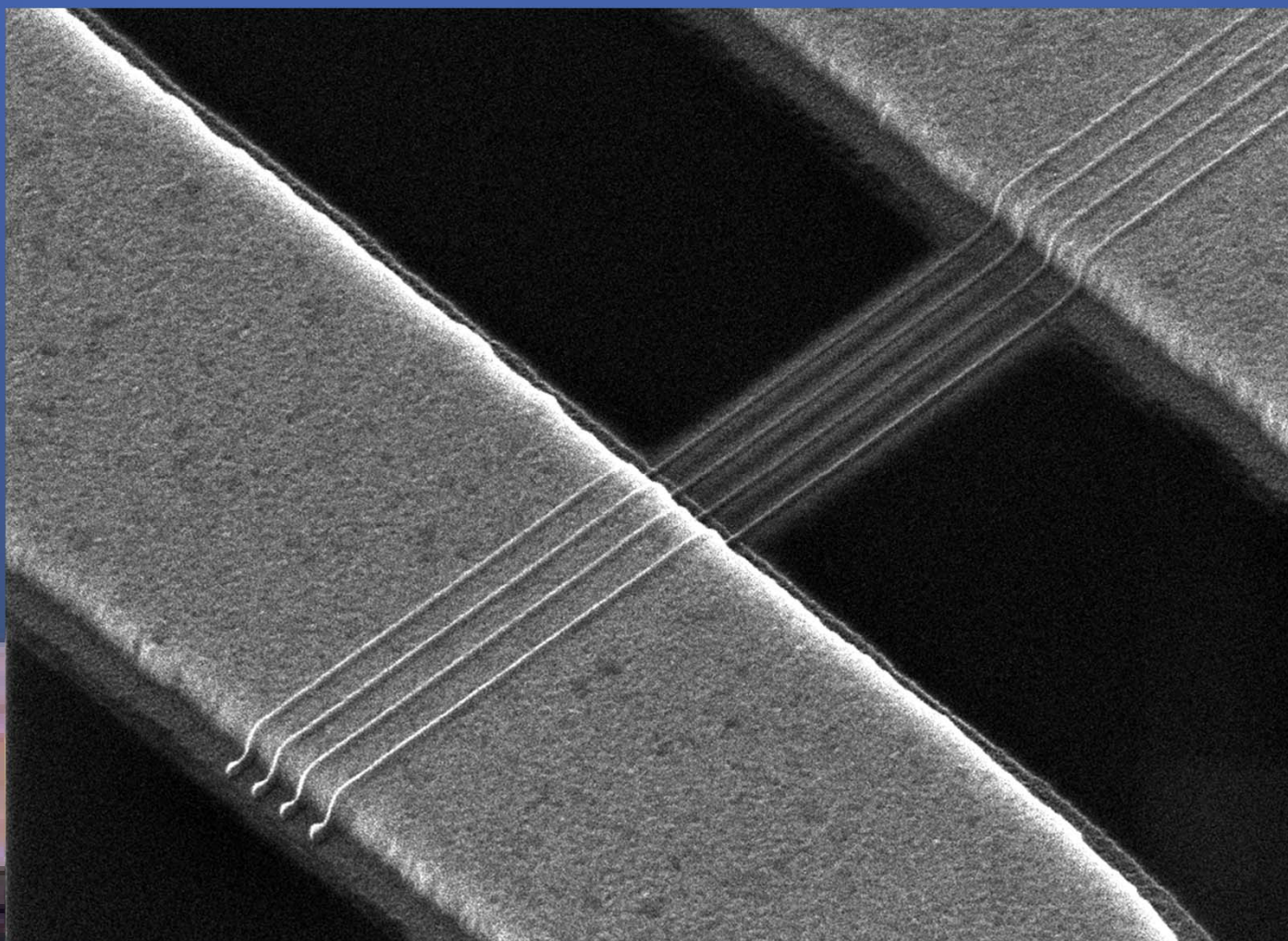
WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:

Stringed Instrument

Description: Using a neon beam and a precursor gas, 20 nm Cobalt lines are deposited between two fingers.



Magnification (3"x4"): 254 kx

Submitted by: John Notte,
Huimeng Wu

Instrument: Zeiss NanoFab (He, Ne, Ga)

Affiliation: Carl Zeiss Microscopy, LLC

EIPBN



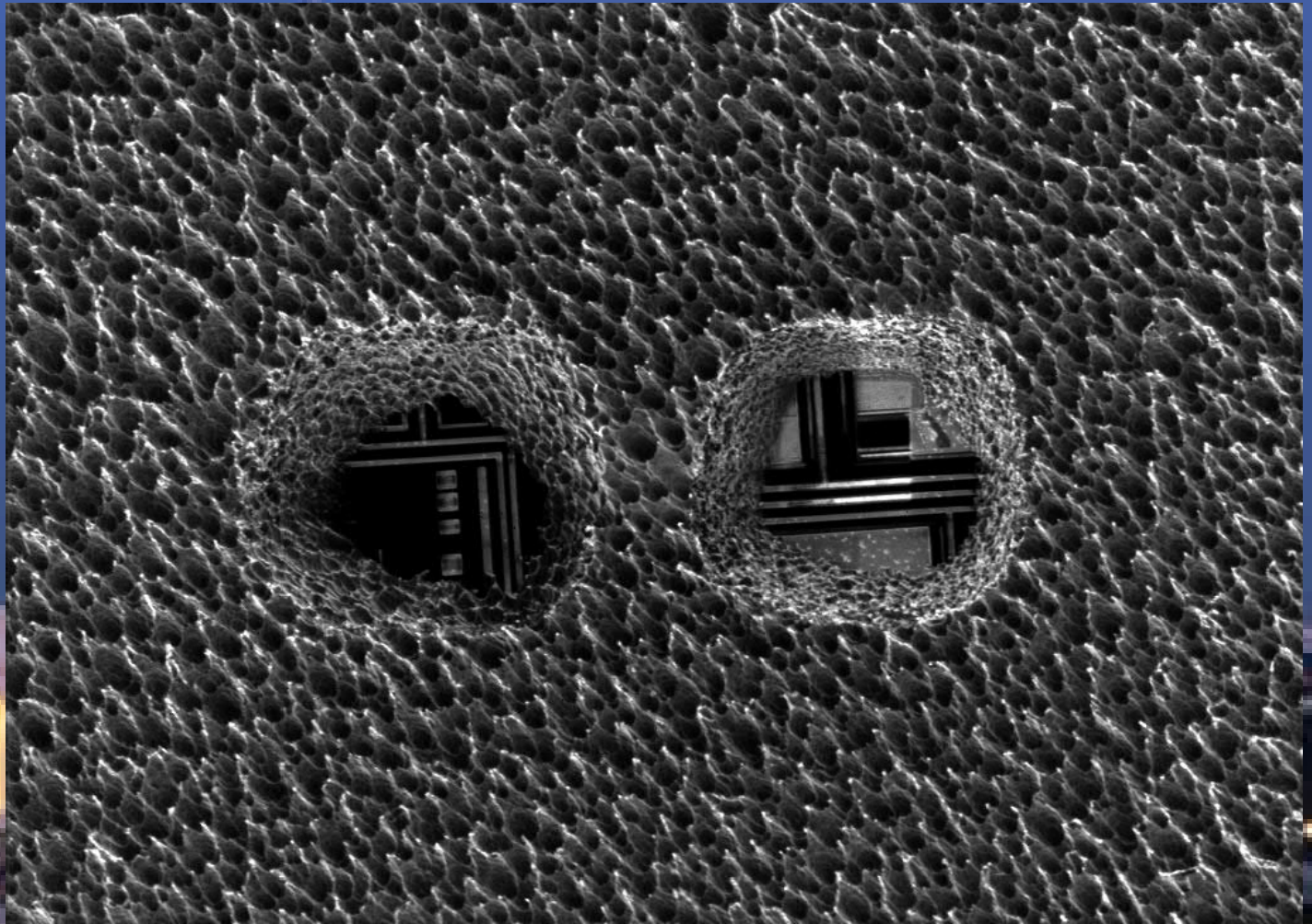
WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:

Peep Holes

Description: Using a gallium beam in conjunction with an etchant gas (XeF₂) two holes penetrate through silicon to view the patterned metal layers below.



Magnification (3"x4"): 1.27 kx

Submitted by: John Notte,
Deying Xia

Instrument: Zeiss NanoFab (He, Ne, Ga)

Affiliation: Carl Zeiss Microscopy, LLC

EIPBN



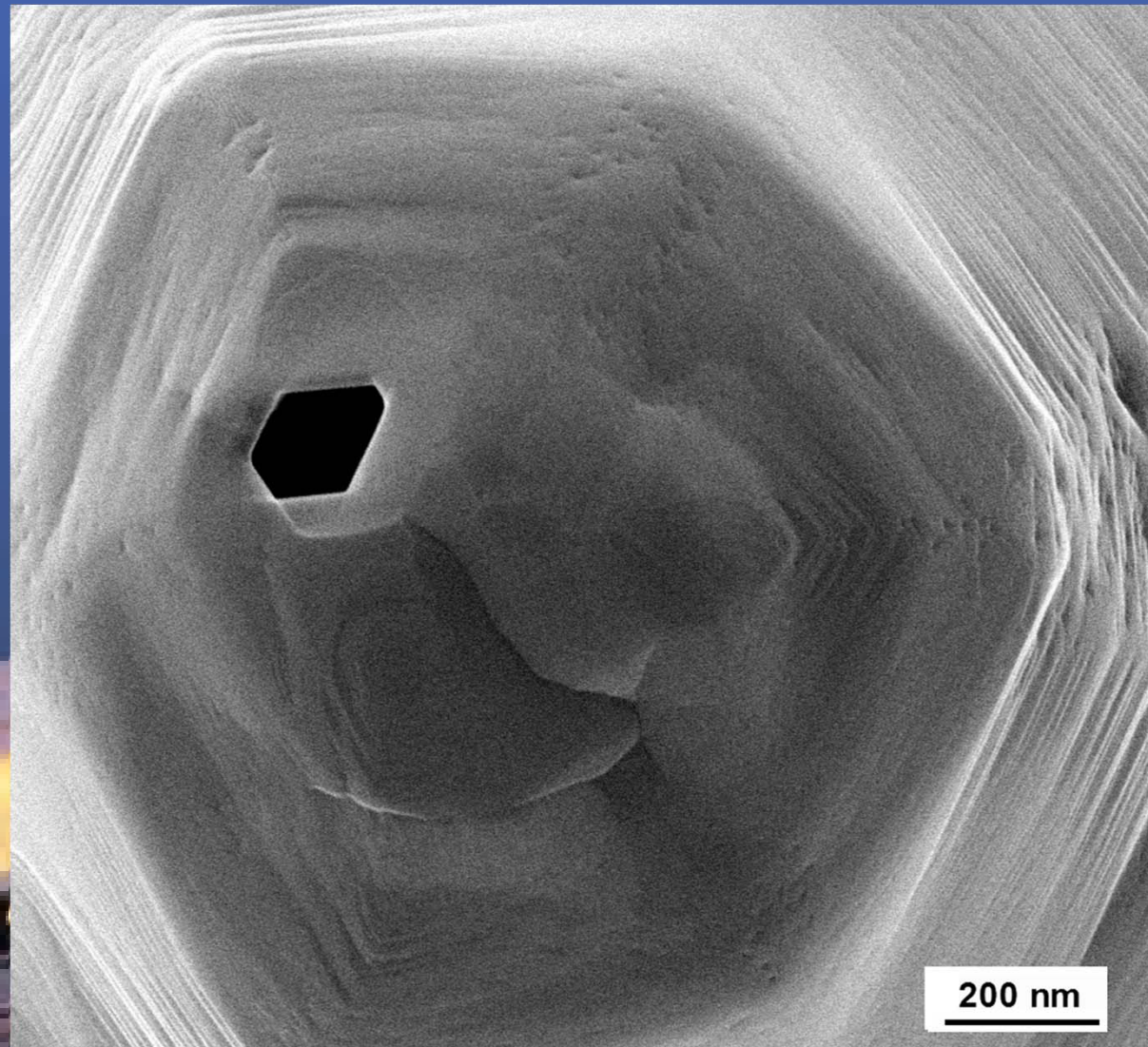
WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:

Eye of the Needle

Description: This image shows a void located near the apex of a tungsten emitter. The hexagonal shape is an indication of the crystallinity of the emitter material.



Magnification 67 kx
Submitted by: John Notte,
Shawn McVey

Instrument: Zeiss ORION (He)
Affiliation: Carl Zeiss Microscopy, LLC

EIPBN

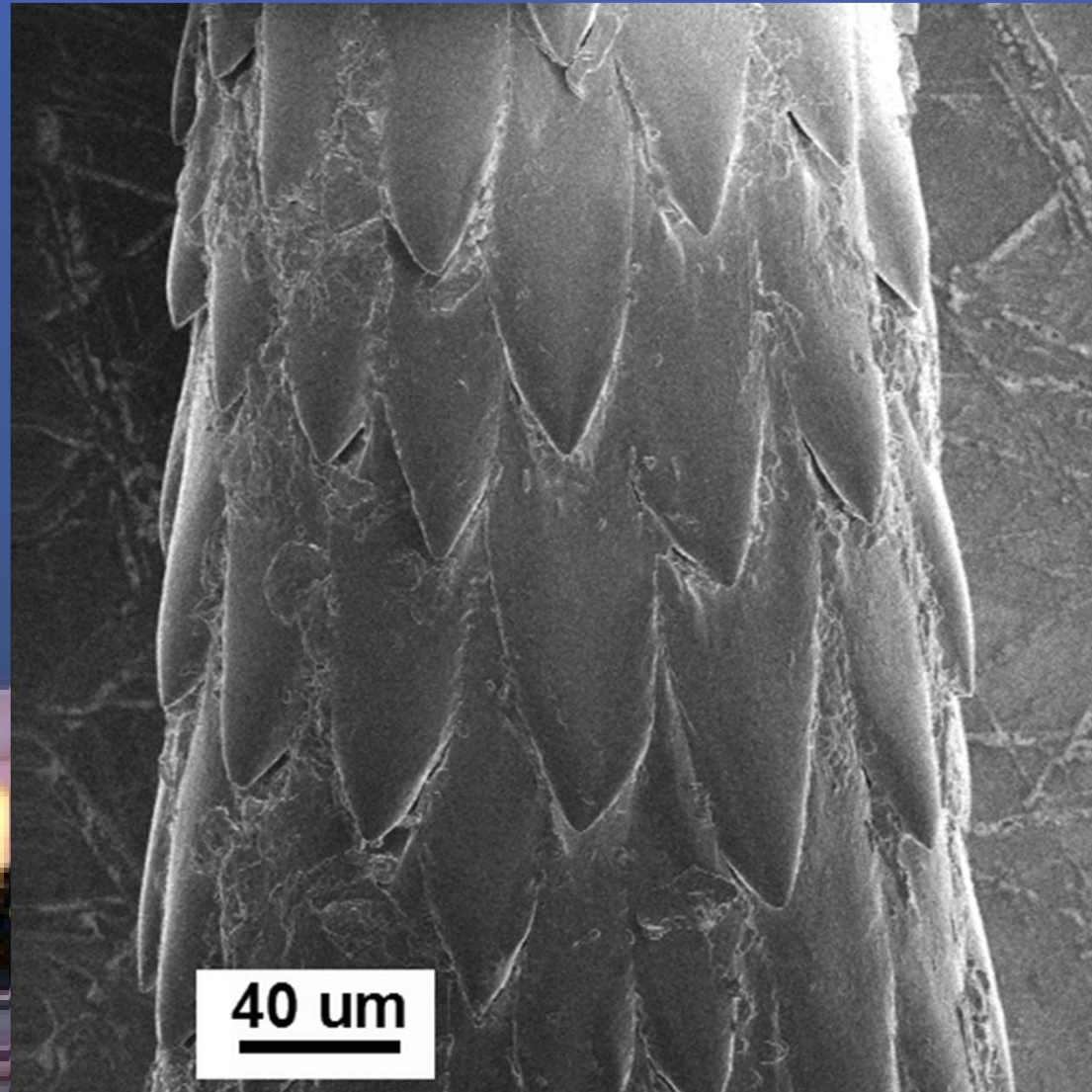


2014 EIPBN MicroGraph Contest

Micrograph Title:

Ouch!

Description: This porcupine quill shows the overlapping plates pointing opposite to the taper. Thus, once implanted, the quills are difficult to remove.



Magnification: 350x
Submitted by: John Notte,
Shawn McVey

Instrument: Zeiss ORION (He)
Affiliation: Carl Zeiss Microscopy, LLC

EIPBN



WASHINGTON DC 2014

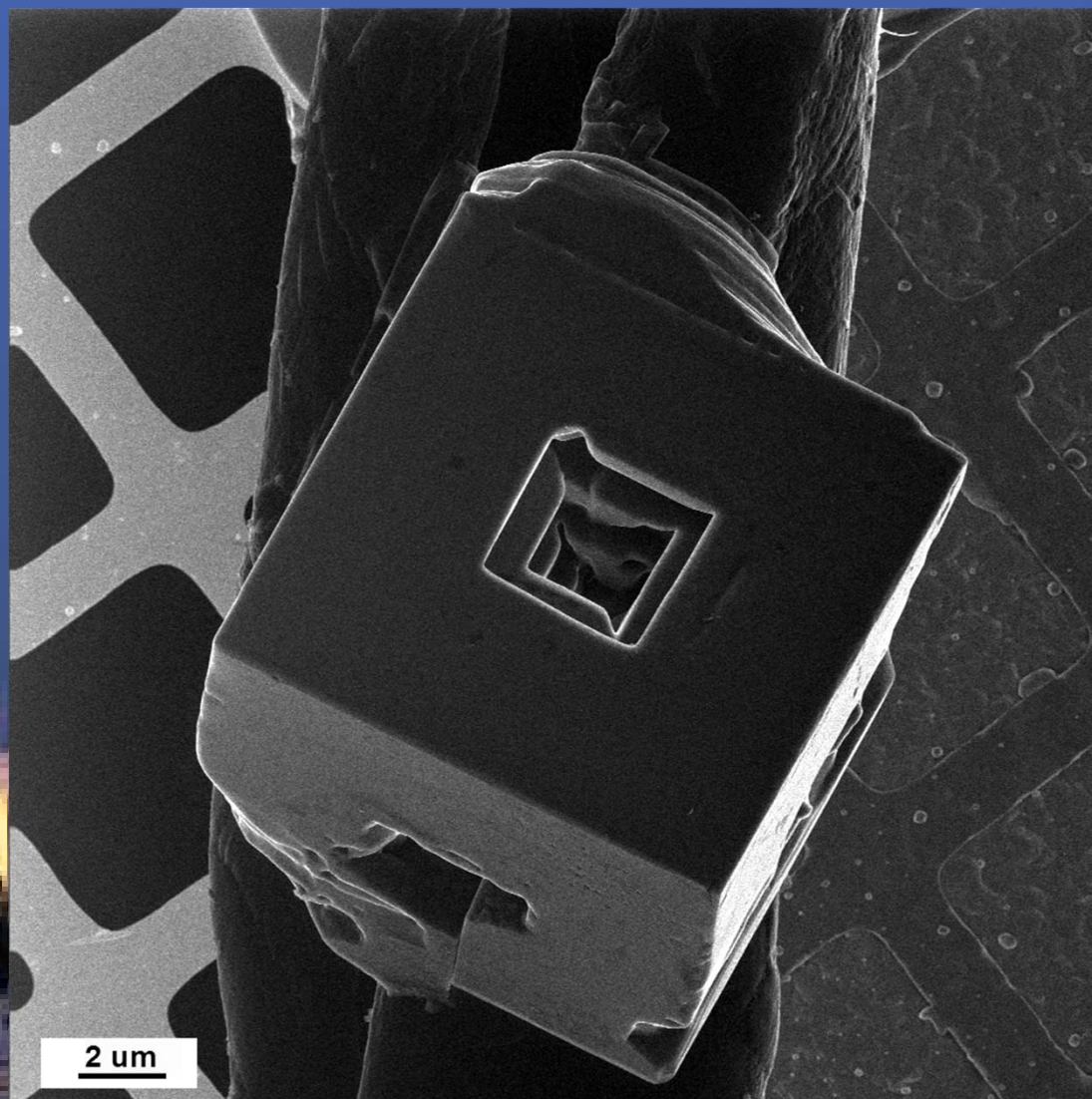
2014 EIPBN MicroGraph Contest

Micrograph Title:

Holy Salt !

Description:

Course grained salt showing a cubical structure with a series of centered square holes.



Magnification 4 kx

Submitted by: John Notte,
Shawn McVey

Instrument: Zeiss ORION (He)

Affiliation: Carl Zeiss Microscopy, LLC

EIPBN

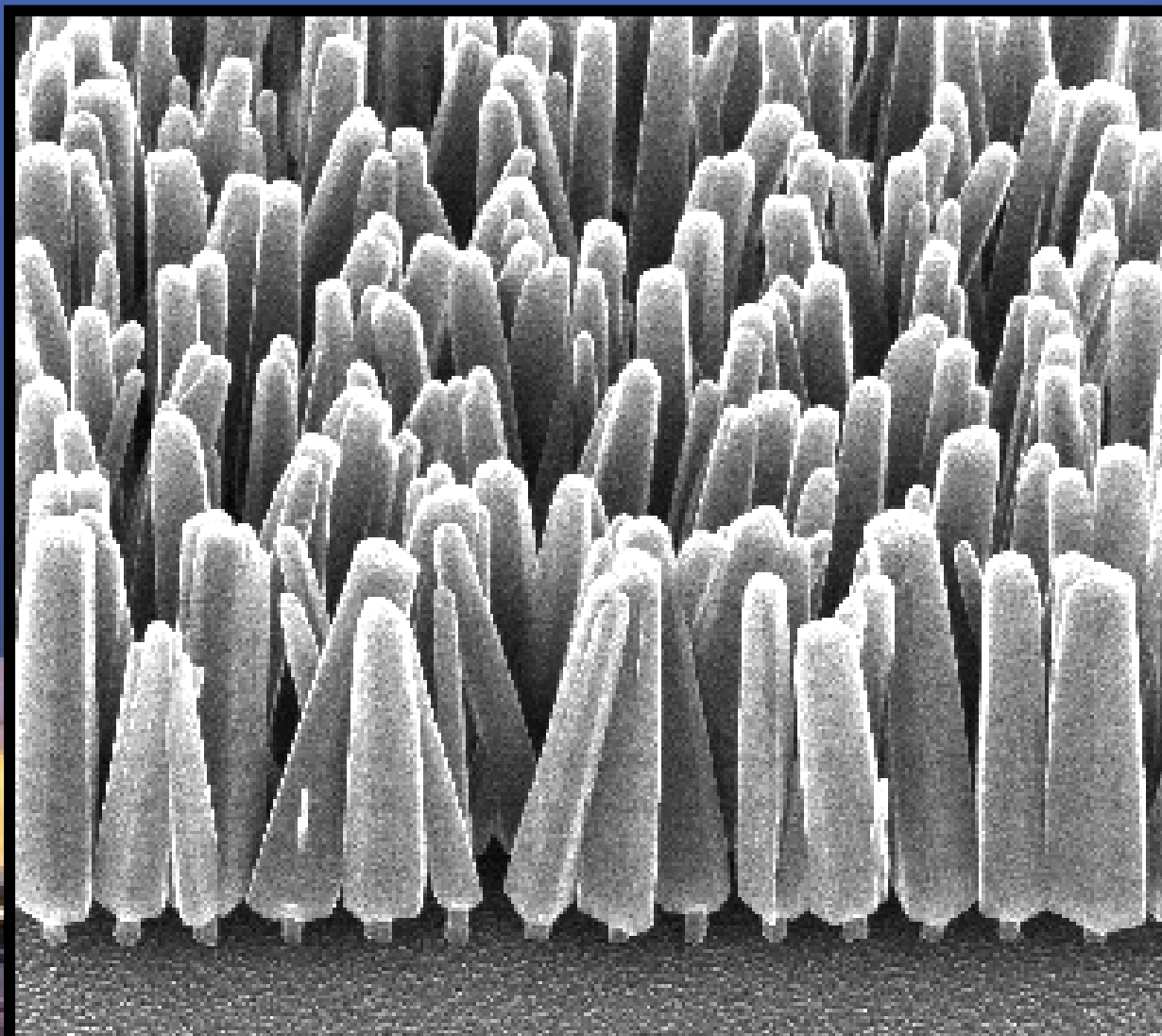


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Nano-shrooms

Description:
What happens when
Alice stumbles upon
Wonderland's forest
of nanomushrooms?



Magnification (3"x4" image): 19KX
Submitted by: Sam Nicaise

Instrument : Zeiss Orion He Ion
Affiliation: MIT

EIPBN



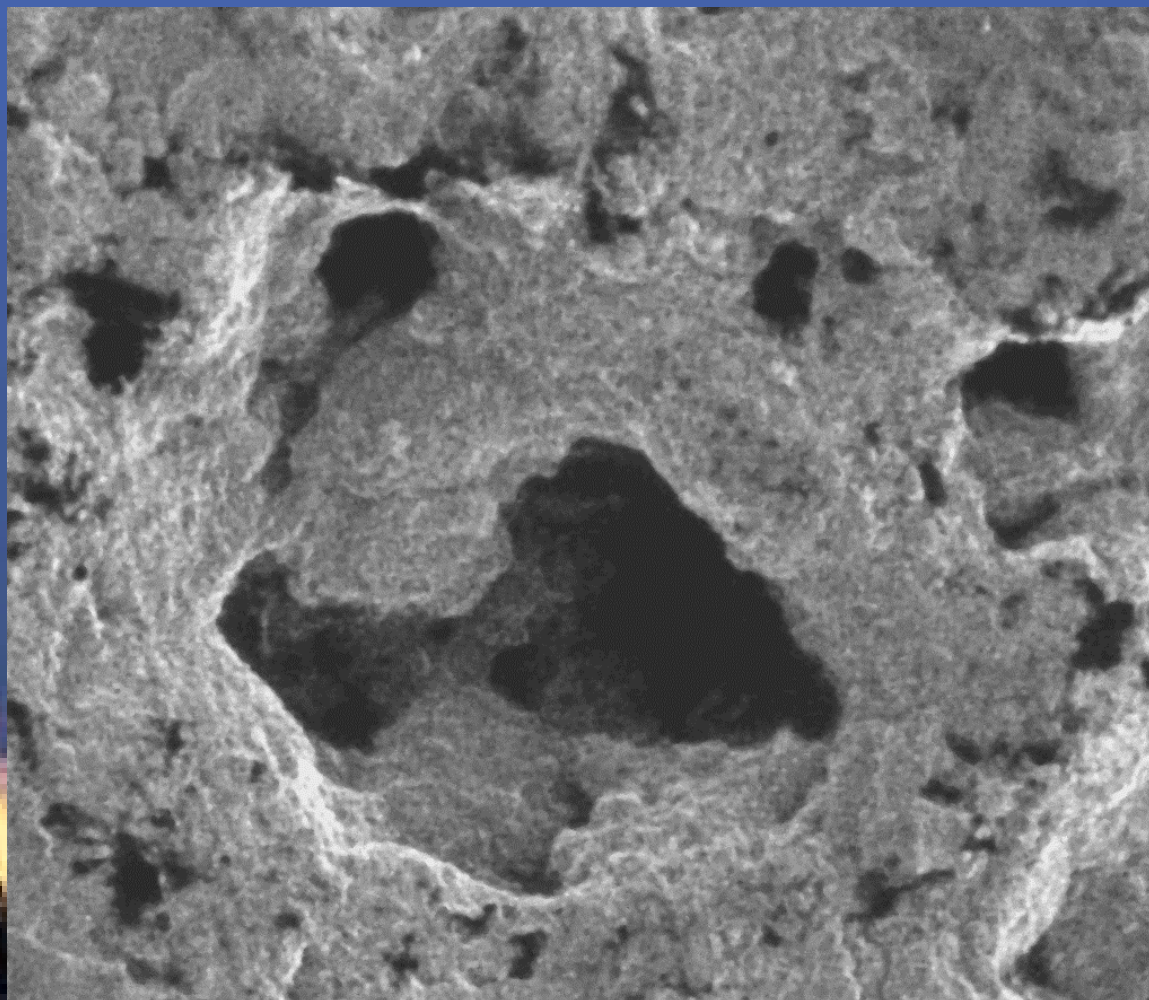
WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Me hungry for lithium...
Om nom nom nom

Description:

A MWCNT-epoxy nanocomposite after exposure to a large dose of UV radiation. The UV degrades the epoxy, leaving behind a surface layer of nanotubes with micro-structured topography. Image taken with secondary electrons from a scanning focused ion beam of lithium.



HFW 30.4 μm	X: 14392.00 μm Y: -8961.50 μm	CNST Li MOTIS	Mag 10.0 kX	Beam 4.00 kV	5 μm
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Magnification (3"x4" image): 10 kX **Instrument : CNST Li Ion Microscope**
Submitted by: Kevin Twedt, Jabez McClelland **Affiliation: CNST, NIST**

EIPBN

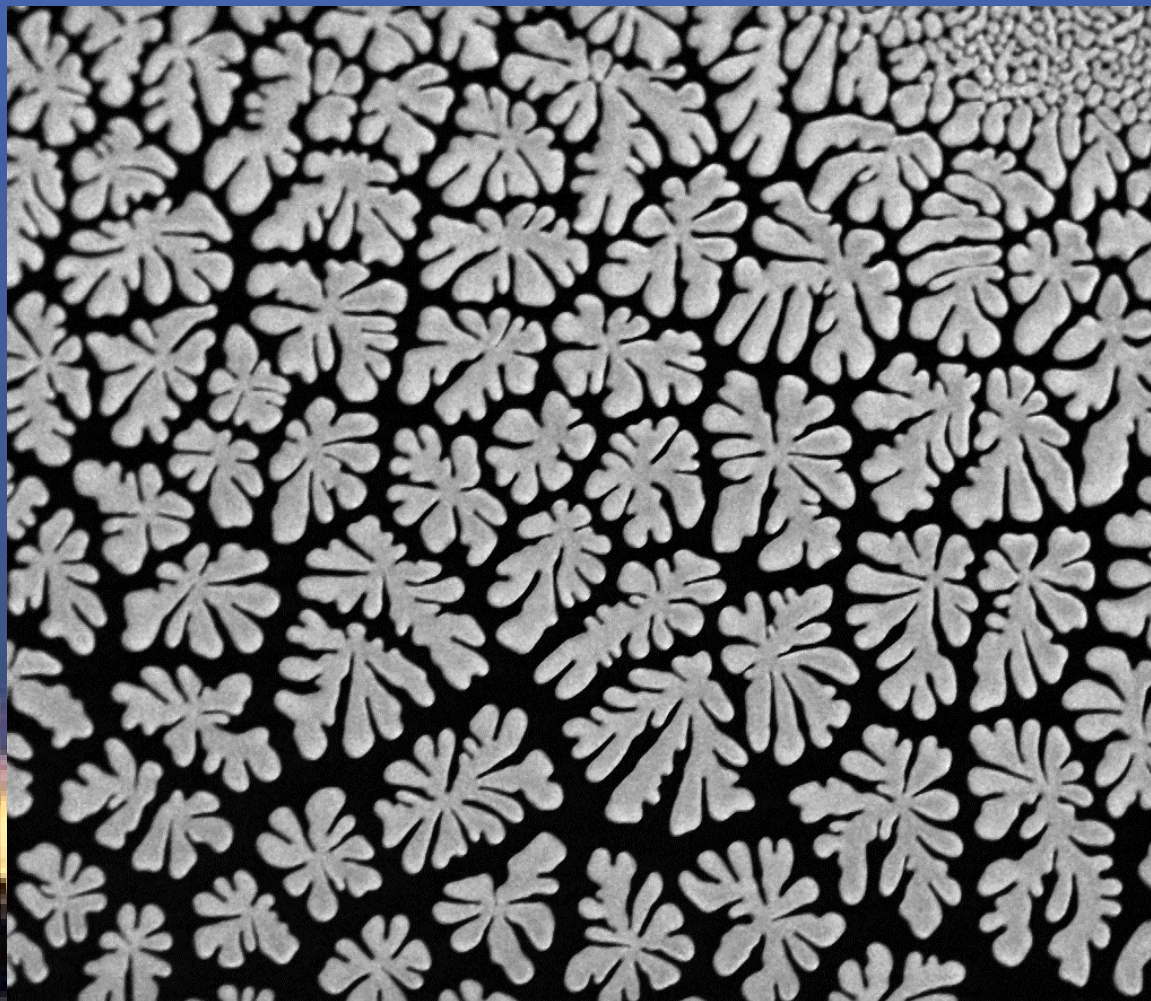


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
No resistin' flower power

Description:
Defects in a nano-imprint
lithography resist at the edge of
the imprint mold.
Image taken with secondary
electrons from a scanning
focused ion beam of lithium.



HFW 380 µm	X: 17552.00 µm Y: 4264.00 µm	CNST Li MOTIS	Mag 800 X	Beam 2.00 kV	100 µm
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Magnification (3"x4" image): 800 X **Instrument : CNST Li Ion Microscope**
Submitted by: Kevin Twedt, Jabez McClelland **Affiliation: CNST, NIST**

EIPBN

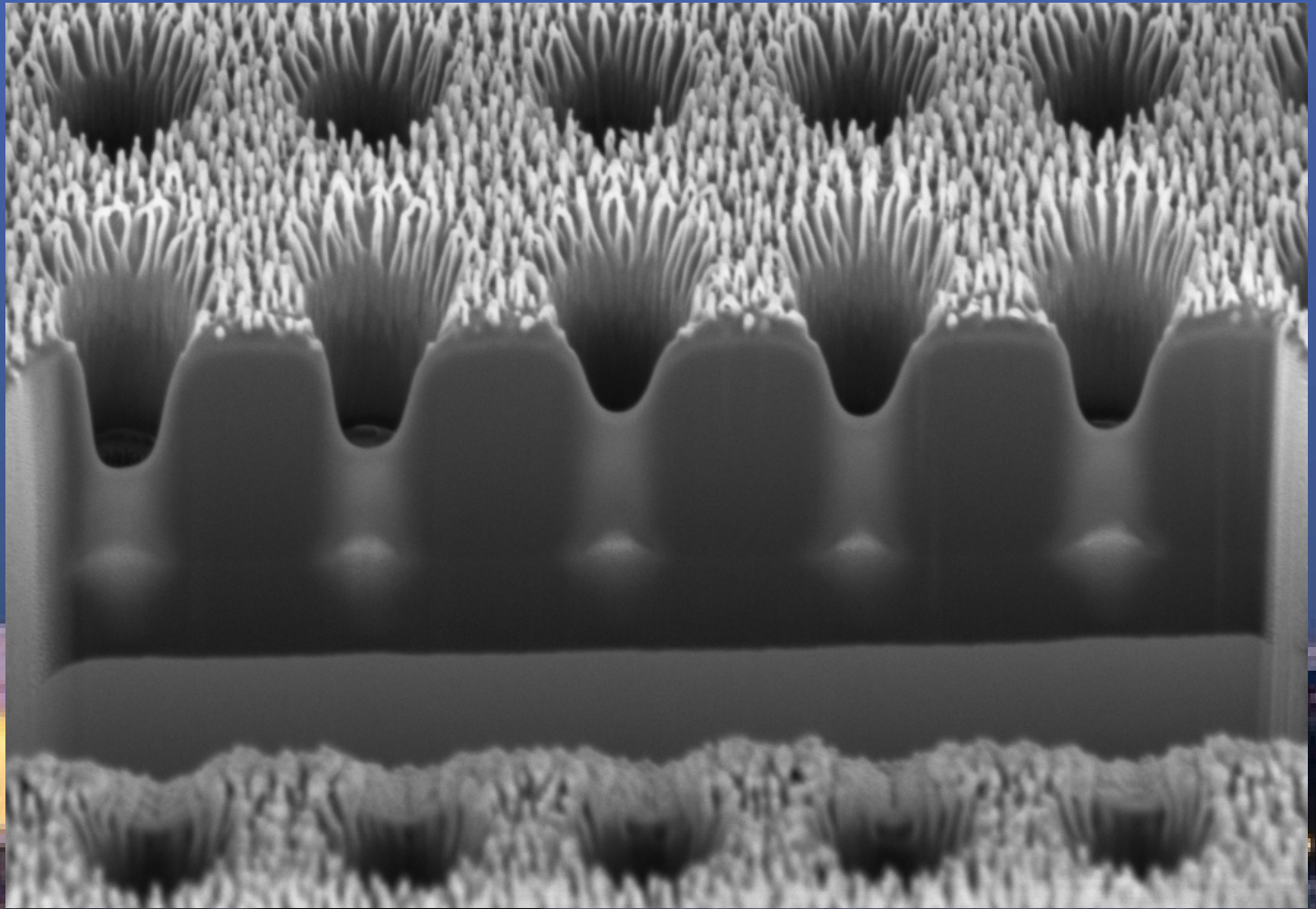


WASHINGTON DC 2014

Micrograph Title:
Wells Digging in
Grass Land

Description:
Grass land was dug
for mystery precious!

2014 EIPBN MicroGraph Contest



Magnification (3"x4" image): 20.50KX
Submitted by: Junjun Ding

Instrument : Zeiss Auriga
Affiliation: Stevens Inst. of Tech.

EIPBN

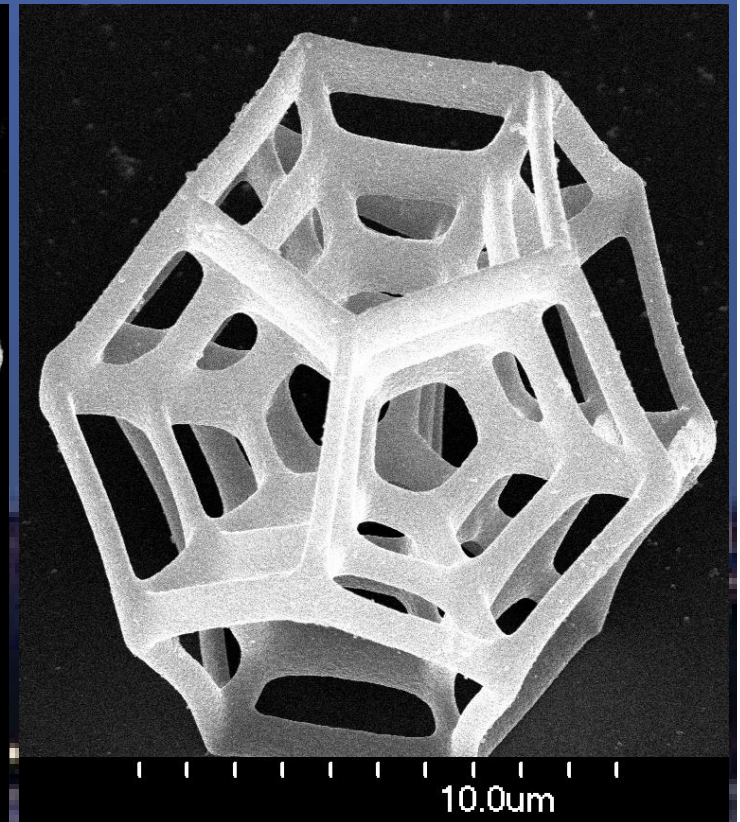
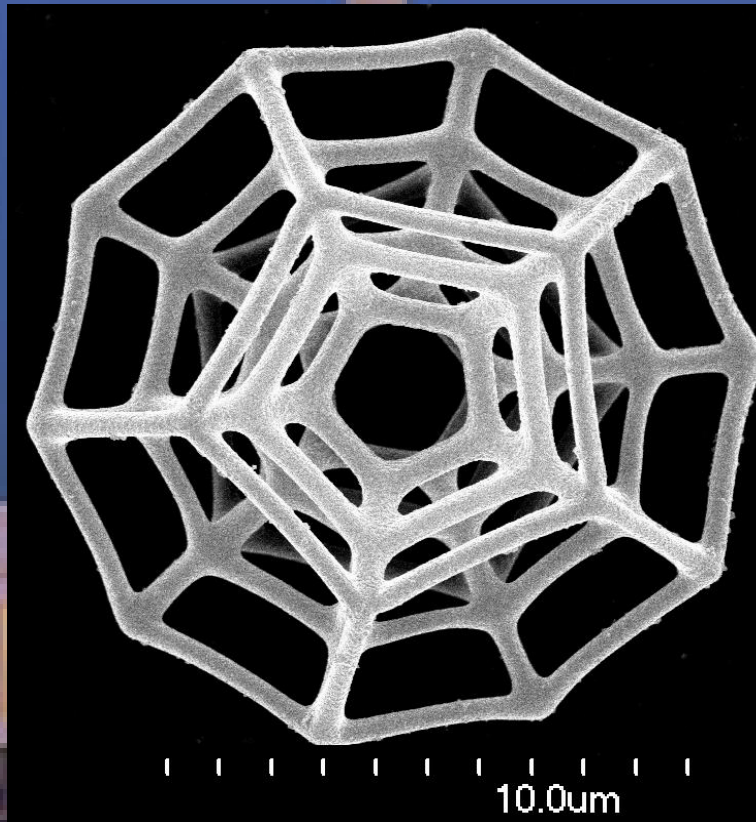


WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
A 3D spider web

Description:
Top and 45° tilted view of a microstructure composed of nested dodecahedron frames, two-photon polymerized by 5 holographic focuses.



Magnification (3"x4" image): 5Kx
Submitted by: Gaszton Vizsnyiczai
Centre, Hungarian Academy of Sciences

Instrument : Hitachi S-4700
Affiliation: Biological Research

EIPBN



WASHINGTON DC 2014

2014 EIPBN MicroGraph Contest

Micrograph Title:
Holographic two-photon
polymerization

Description:
Holographic two-photon
polymerization of a
microstructure
composed of nested
dodecahedron frames
(circumscribed
sphere radius: 10.5
 μm) is visible in IPL
photoresist.

SORRY THE VIDEO DOSN'T WORK
IN PDF. PLEASE SEE VIDEO ON
WEBSITE.

Magnification (3"x4" image): 100x
Submitted by: Gaszton Vizsnyiczai
Centre, Hungarian Academy of Sciences

Instrument : Zeiss Axiovert 40
Affiliation: Biological Research

EIPBN

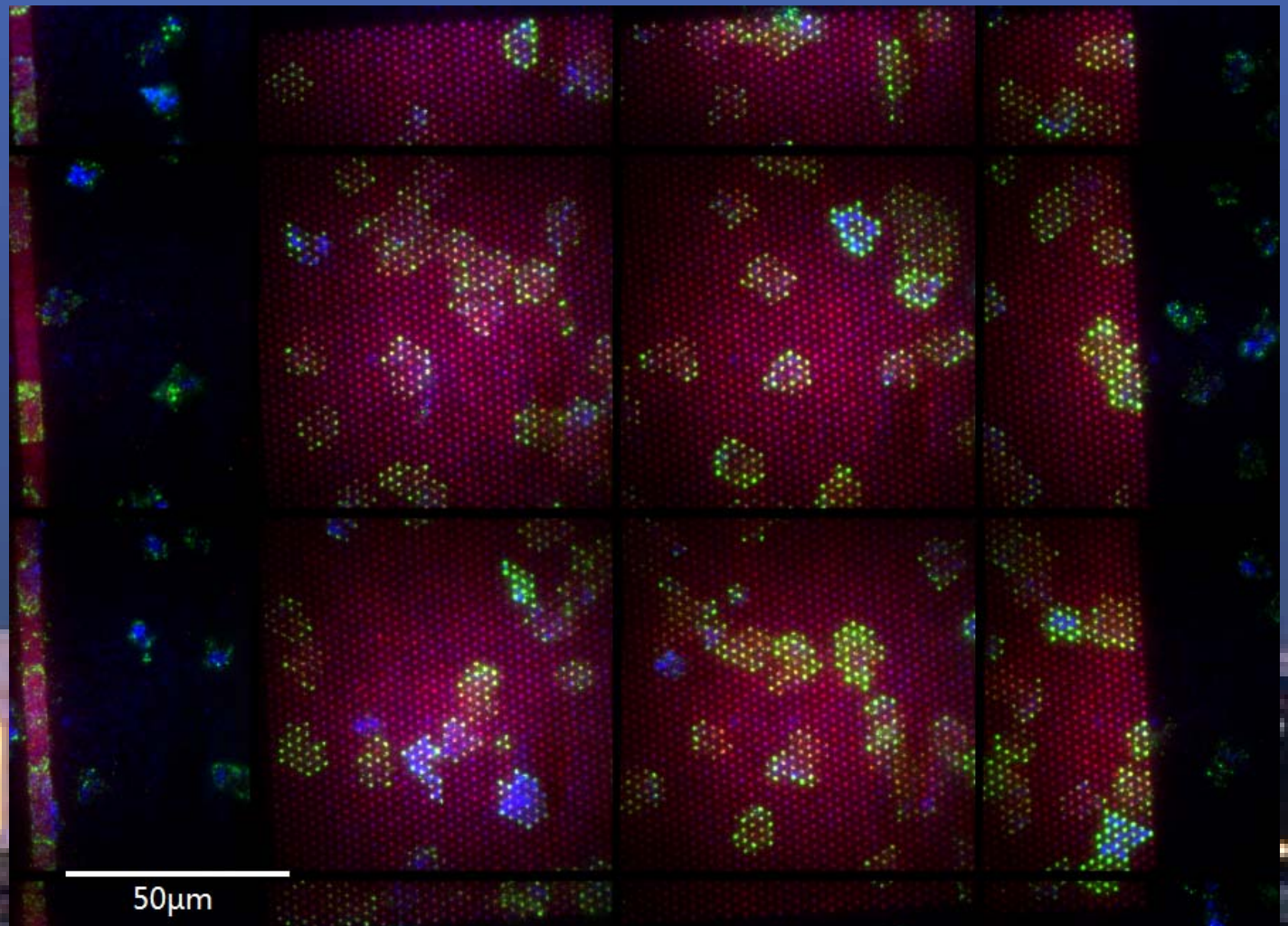


2014 EIPBN MicroGraph Contest

Micrograph Title:
Nano Stained Glass

Description:
A TIRF (total internal reflection fluorescence) image of human T cells on nanoarrays of T cell receptor binding ligands.

Color	Wave-length	Molecule
Red	561nm	UCHT1 Fab
Green	488nm	pY
Blue	405nm	ICAM-1



Magnification (3"x4" image): 100X (Obj) **Instrument : Nikon TIRF**
Submitted by: Haogang Cai **Affiliation: Columbia University**

EIPBN



WASHINGTON DC 2014

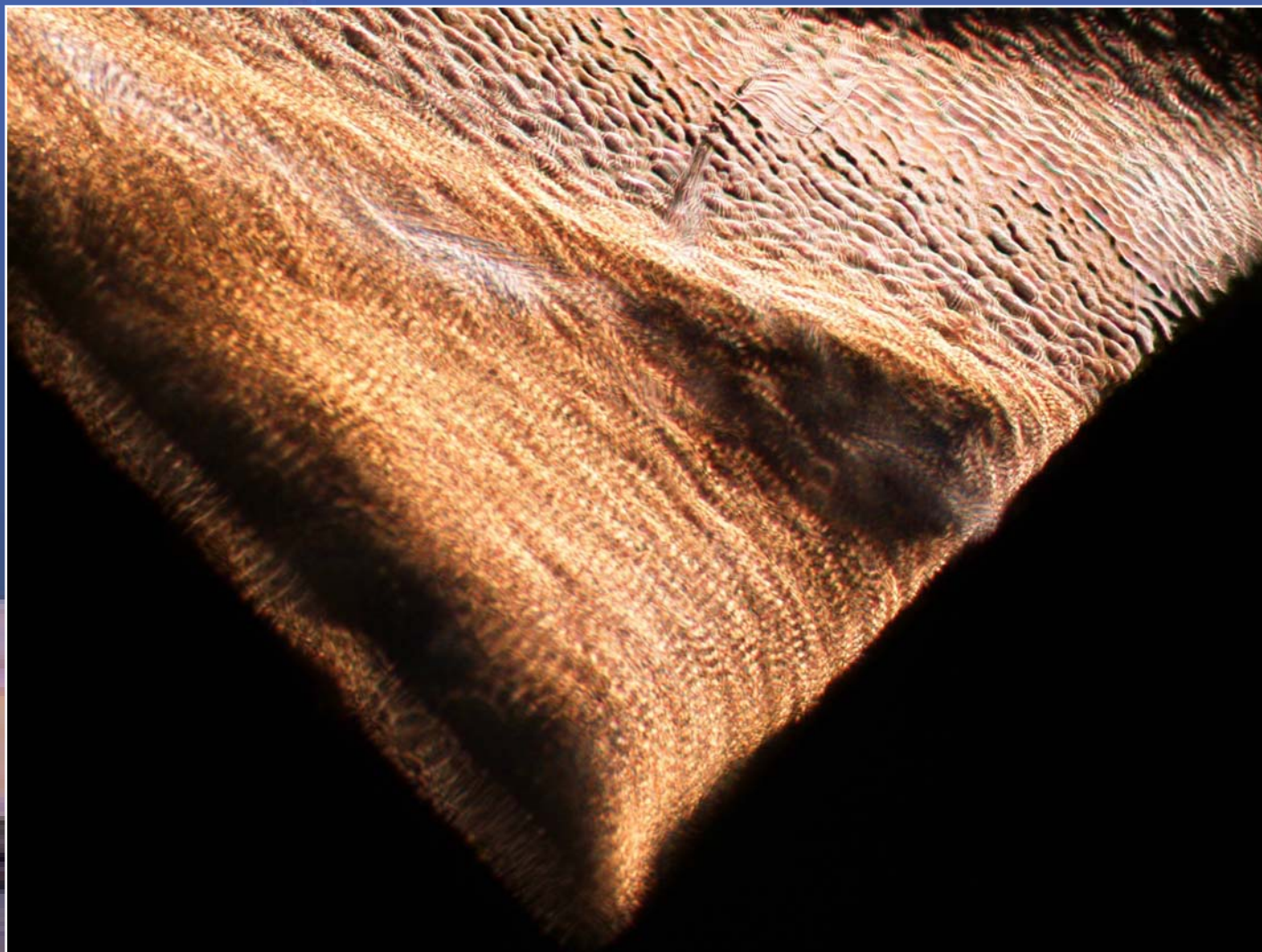
2014 EIPBN MicroGraph Contest

Micrograph Title:

C u in metal hell

Description:

A copper foil with graphene on top, getting it flat is a hellish task.



Magnification (3"x4" image): 42 X

Submitted by: L. Häusler

Instrument : NIKON LV 150

Affiliation: PROFACTOR GmbH

EIPBN



WASHINGTON DC 2014

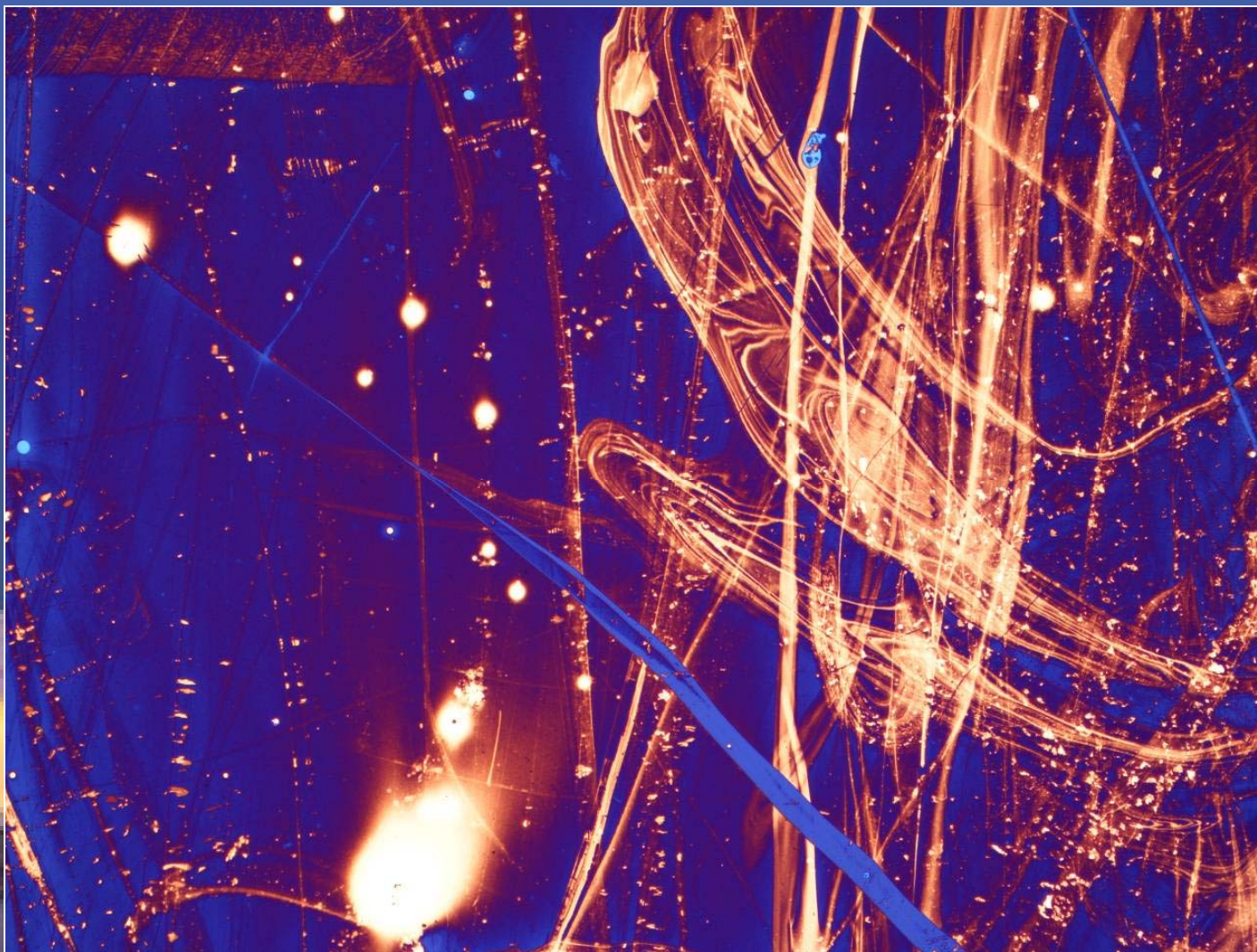
2014 EIPBN MicroGraph Contest

Micrograph Title:

gg - golden galaxy

Description:

A gold etching experiment went wrong, but ended up just being beautiful.



Magnification (3"x4" image): 42 X

Submitted by: Lukas Häusler

Instrument : NIKON LV 150

Affiliation: PROFACTOR GmbH

EIPBN



WASHINGTON DC 2014

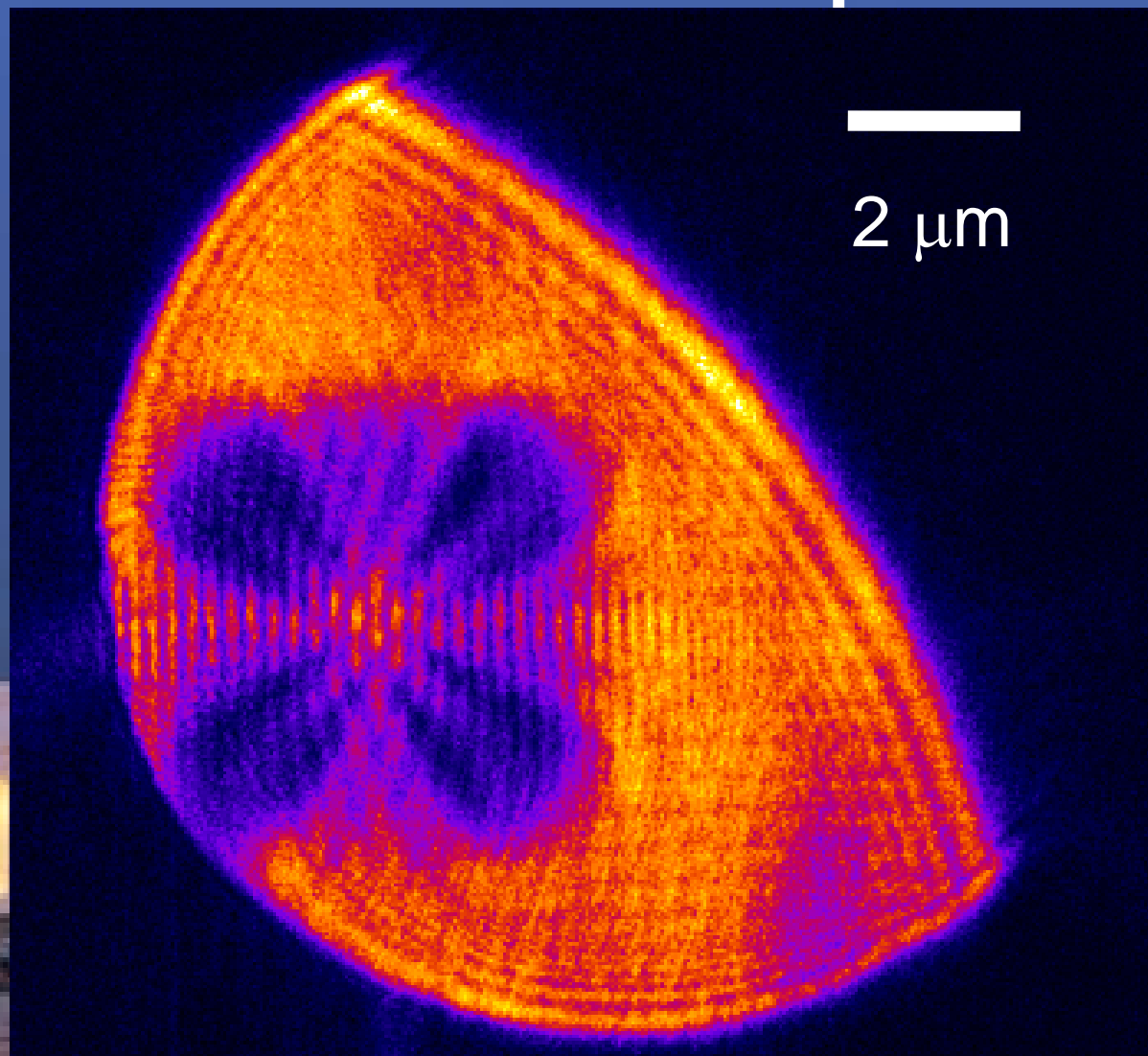
2014 EIPBN MicroGraph Contest

Micrograph Title:

EUV Butterfly

Description:

**Coherent-EUV
Shadowgraph of
pyramid structure**



Magnification (3"x4" image): 4.5 kX

Submitted by: Tetsuo Harada

Instrument : EUV Micro-CSM

Affiliation: Univ. of Hyogo

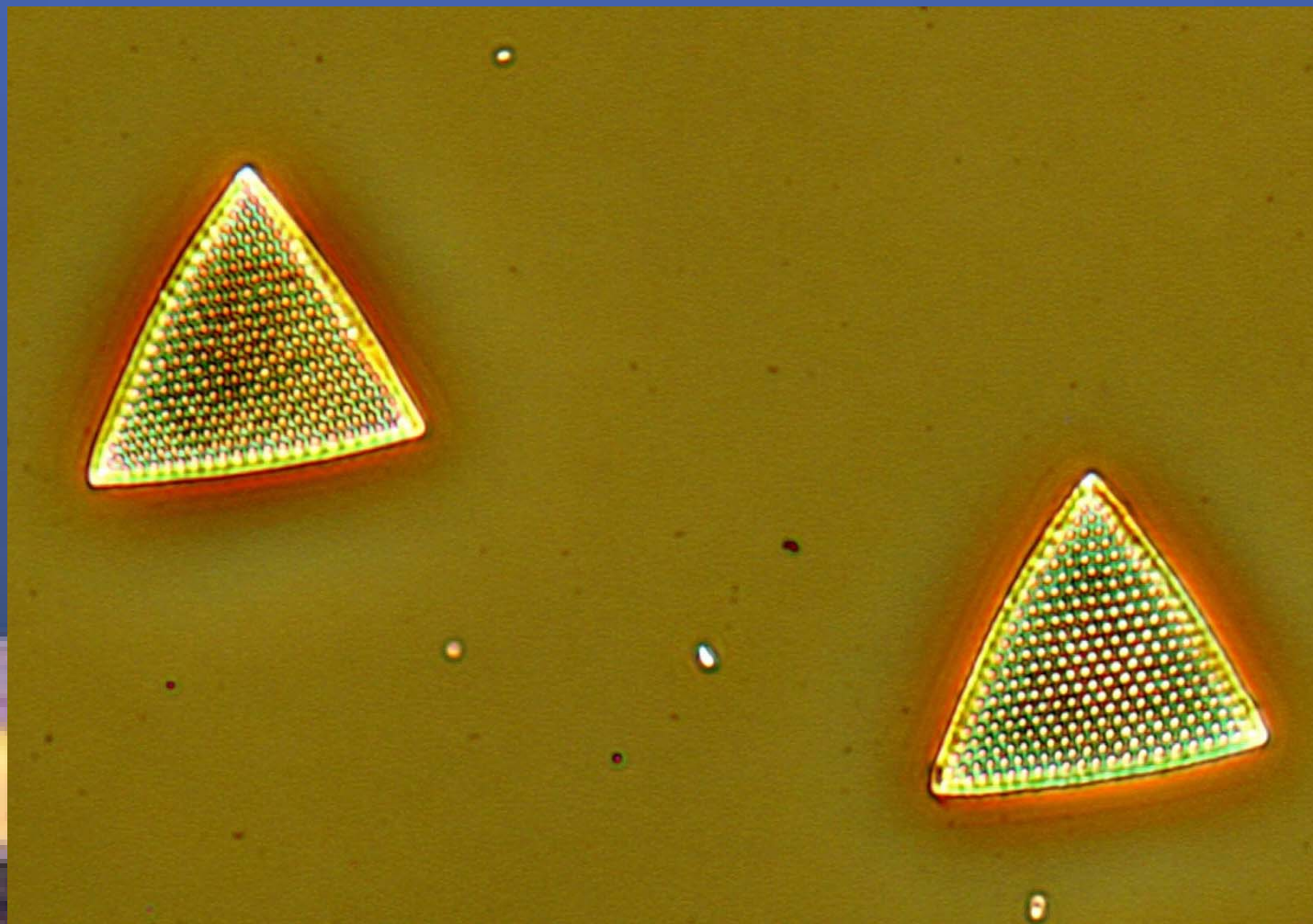
EIPBN



WASHINGTON DC 2014

Micrograph Title:
Microfabricated
Diatoms
Description:
Phase optical
micrograph of
multiphoton
fabricated silica
diatom-like
microstructures.

2014 EIPBN MicroGraph Contest



Magnification (3"x4" image): 200KX **Instrument :** (Nikon Eclipse E600)
Submitted by: Bryan Kaehr **Affiliation:** Sandia National Labs