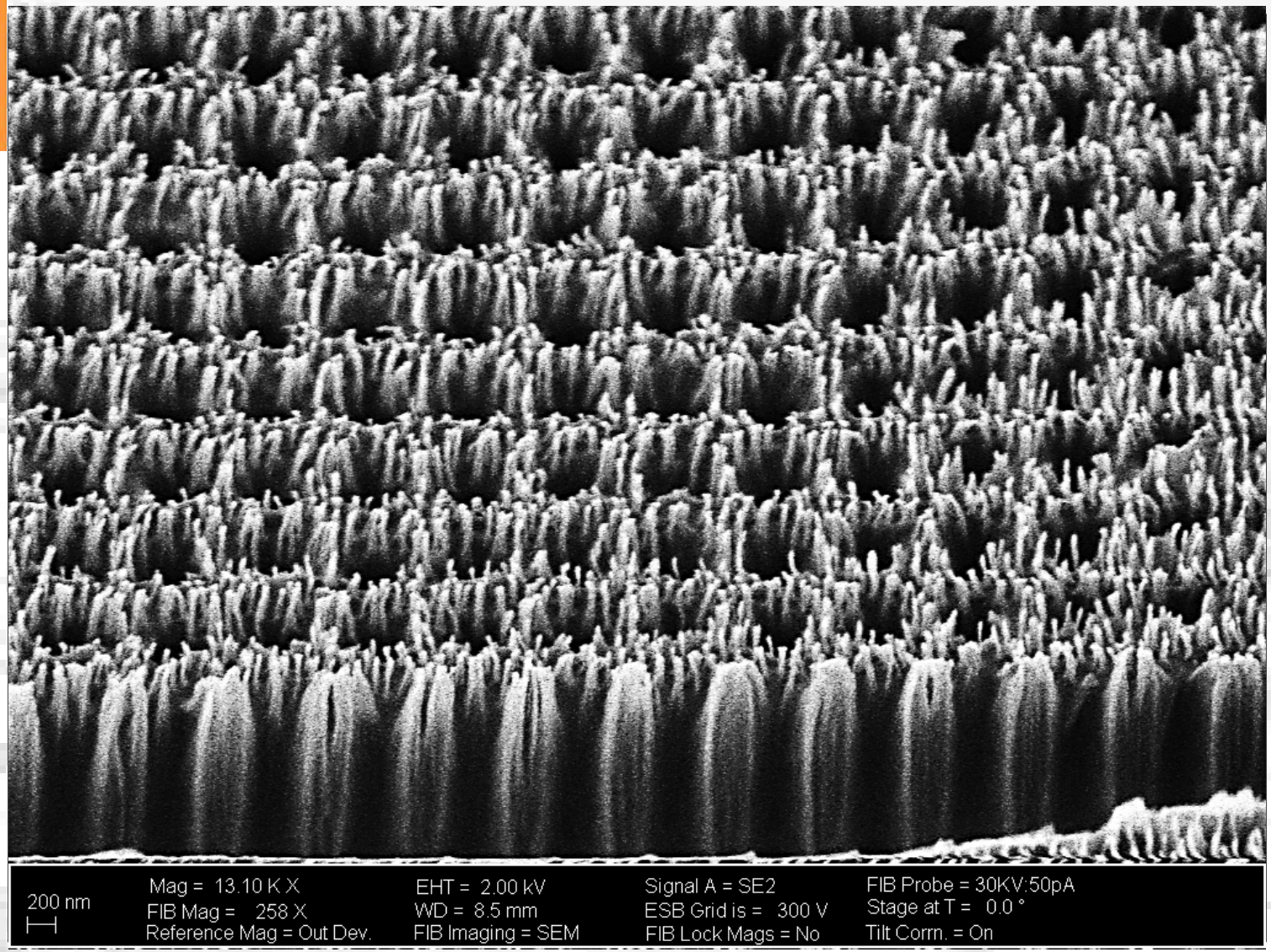
2011 EIPBN MicroGraph Contest

Micrograph Title: Crop circle?

Description: Unusual etching profiles on photoresist hole patterns



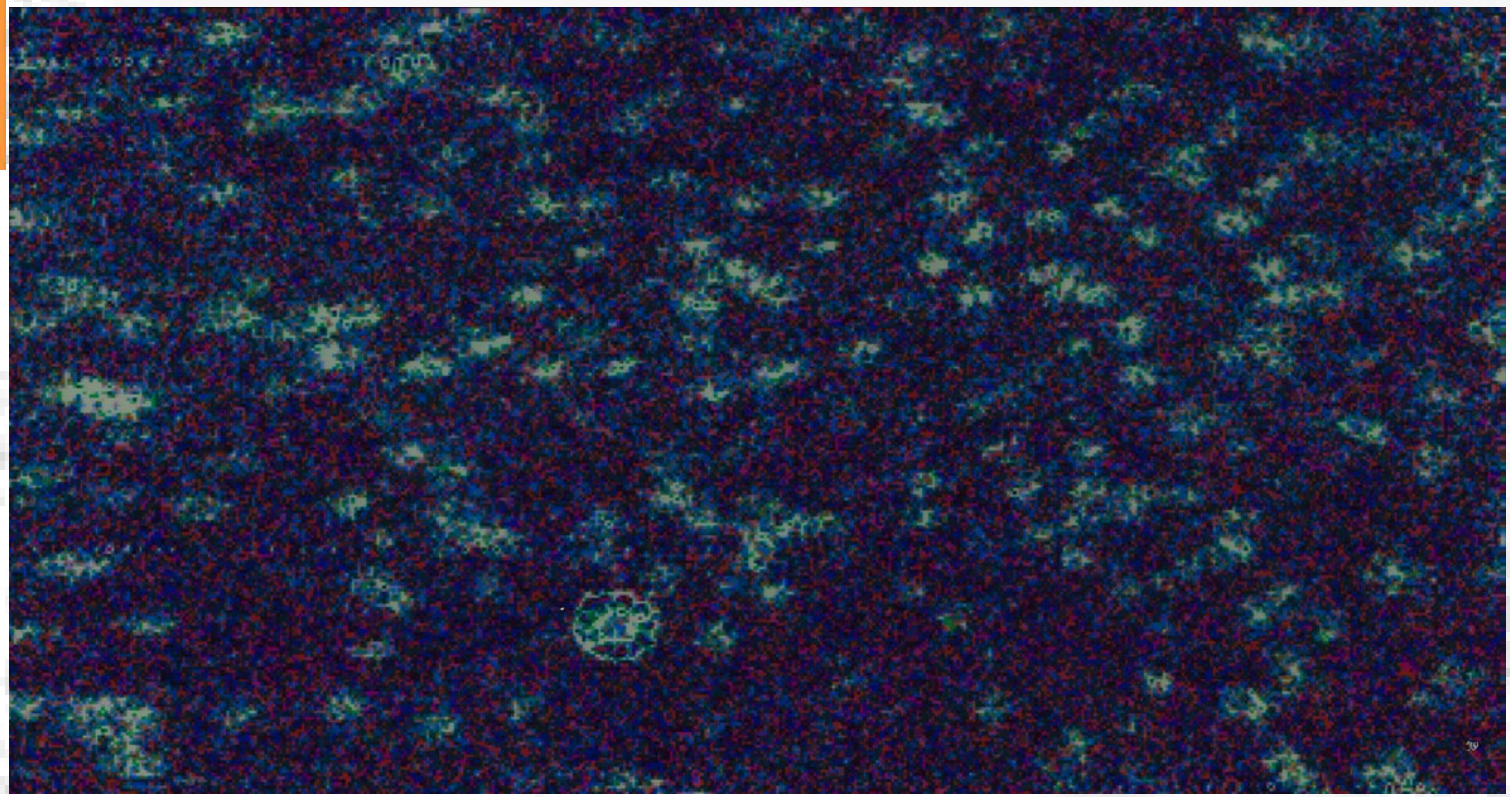
Magnification (3"x4" image):

Submitted by: Ke Du

Instrument (Make and Model): Zeiss Auriga

Affiliation: Stevens Institute of Technology

2011 EIPBN MicroGraph Contest



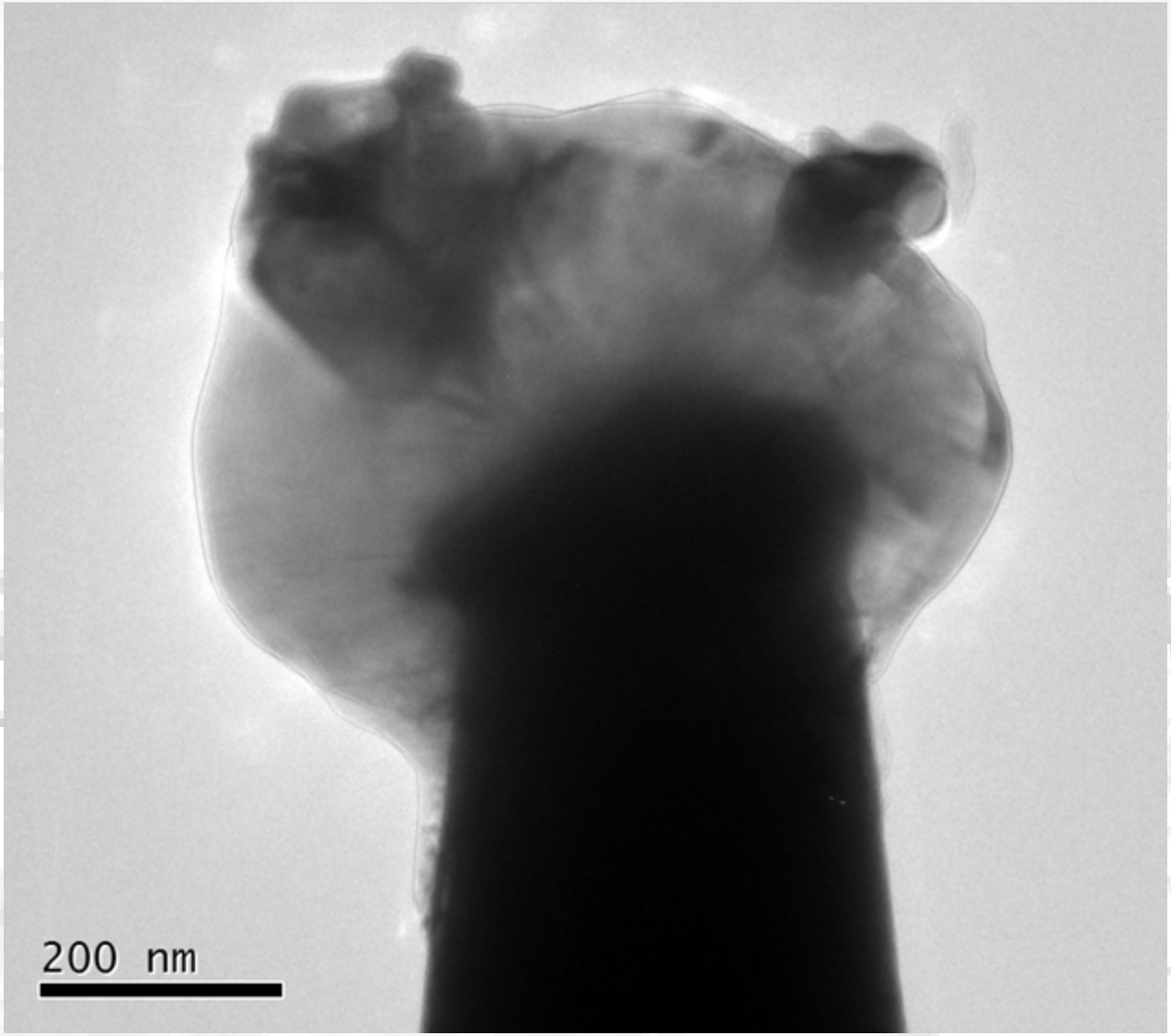
Micrograph Title:
Water Lilies

Description:
Secondary electron Photoemission Micrograph of Lateral Inhomogeneities in AlGaN

Magnification (3"x4" image): 423x (30um x 60um)
Instrument (Make and Model): Maximum (UW Madison)
Submitted by: G. F. Lorusso, H Solak

Affiliation: IMEC, EULITHA

2011 EIPBN MicroGraph Contest



Micrograph Title:

Toadette

Description:
Toadette was looking for Toad. She went down an unfamiliar alley in Mario Party 9 only to find a strange new nano world full of much more interesting characters. She thinks she can forget about Toad now.

Magnification (3"x4" image): 100KX
Submitted by: Josh Ballard and Maia Bischof

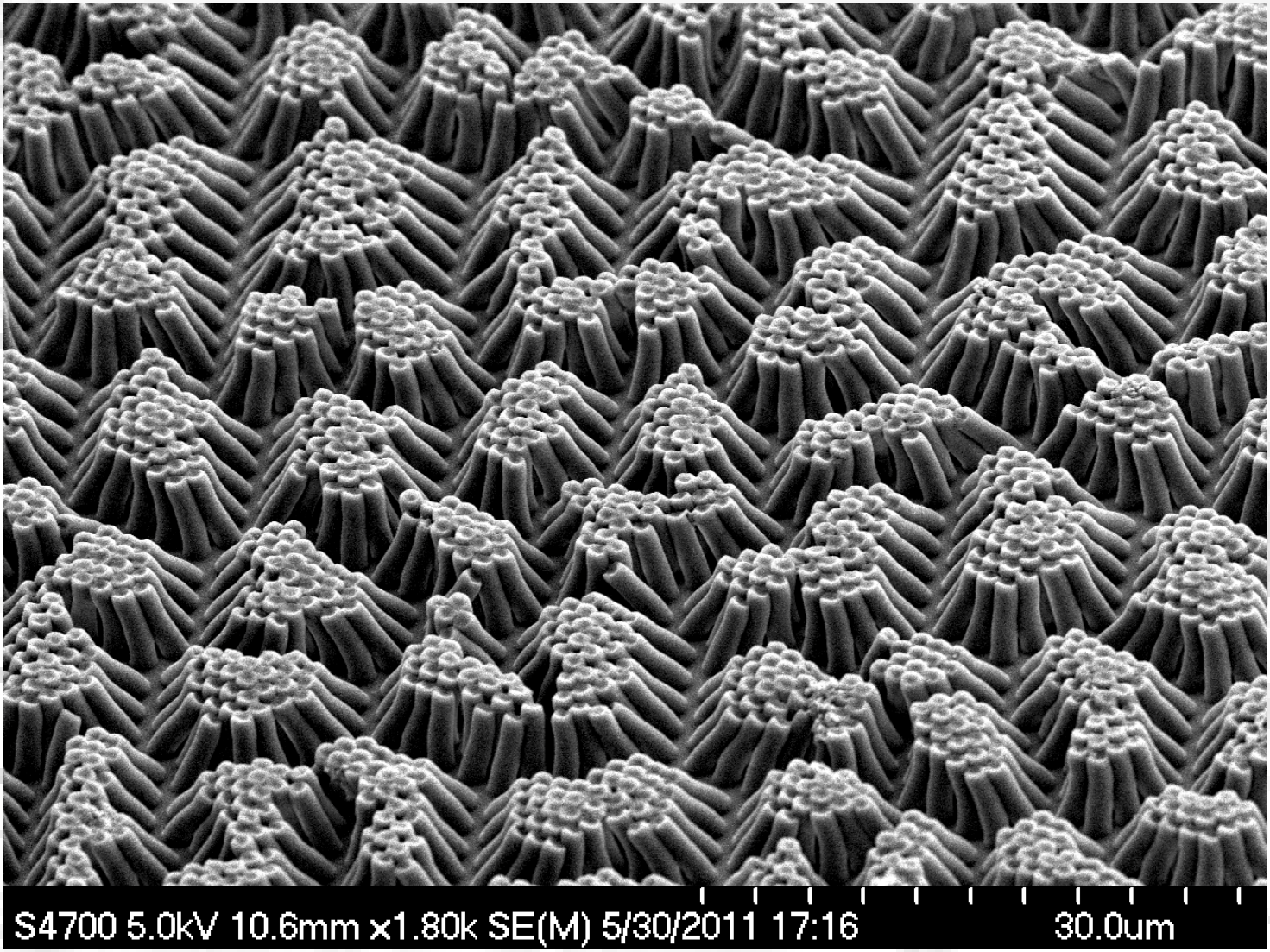
Instrument (Make and Model): FEI Tecnai TF20
Affiliation: Zyvex Labs and UNT

2011 EIPBN MicroGraph Contest

Micrograph Title:
Joseph's Dream No. 1

Description:

A hexagonal array of PDMS pillars that adhered to each other in air because of the high aspect ratio.



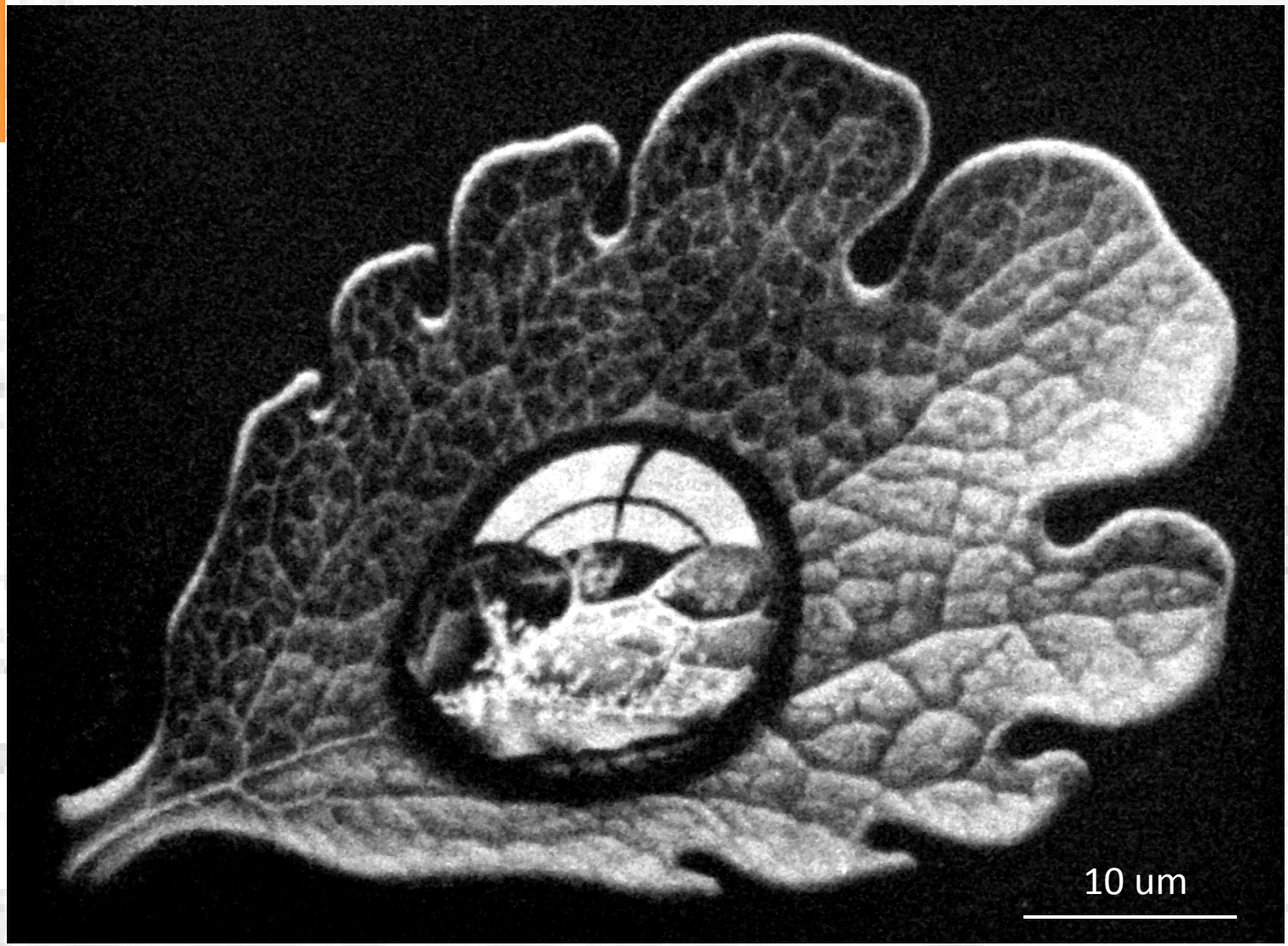
Magnification (3"x4" image):
Submitted by: Saba Ghassemi

Instrument (Make and Model): Hitachi 4700 SEM
Affiliation: Columbia University

2011 EIPBN MicroGraph Contest

Honey I shrunk the Escher

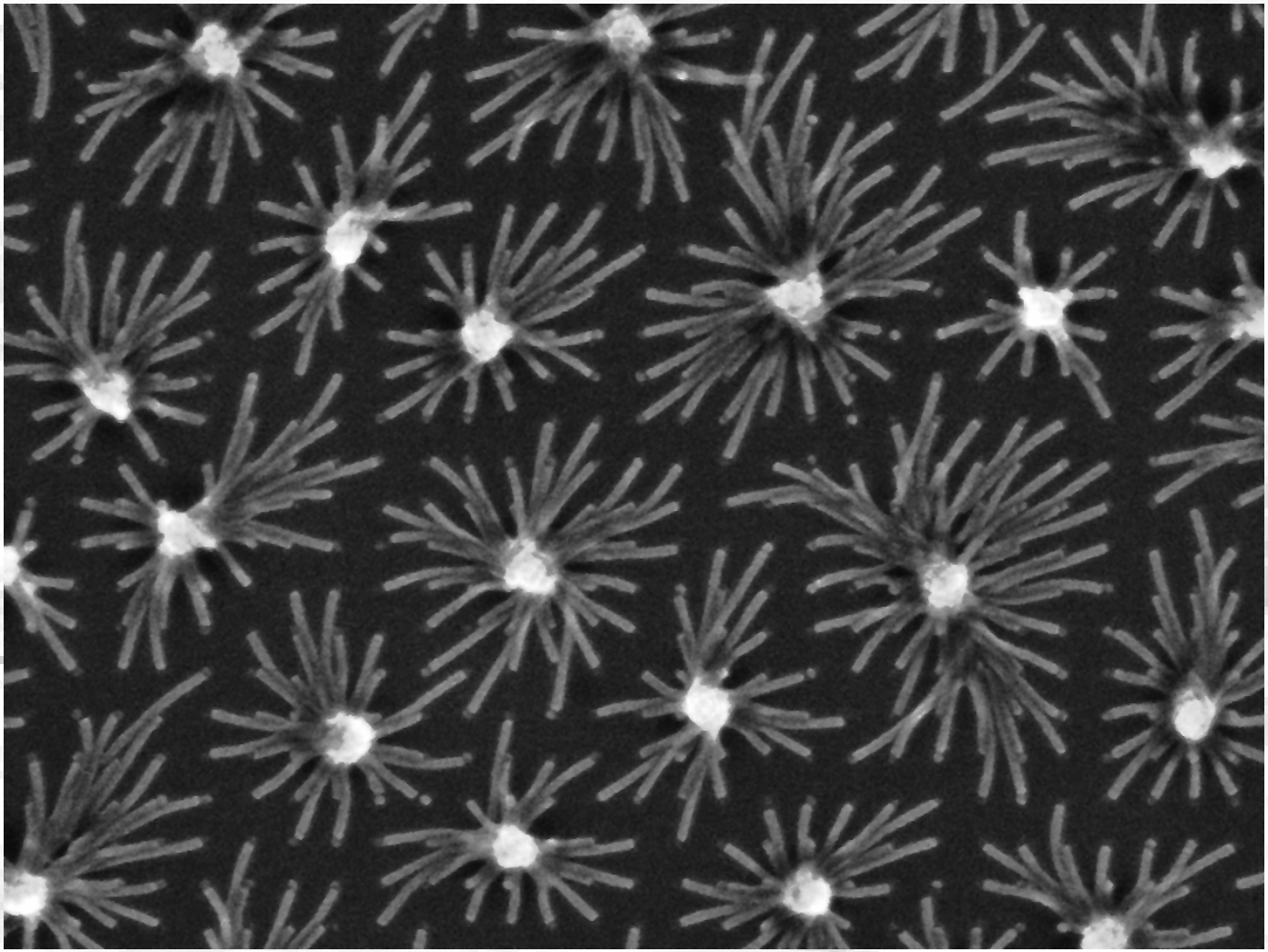
SEM image of M.C. Escher's 1948 Drop as "sketched" by e-beam lithography in such a way as to preserve the grayscale information. Medium: HSQ on Si



Magnification (3"x4" image): 3,300x
Submitted by: Joel Yang

Instrument (Make and Model): Elionix ESM-9000
Affiliation: IMRE

2011 EIPBN MicroGraph Contest



Micrograph Title:
Gecko legs

Description:
A SEM image of assemblies of collapsed 60-nm-pitch high-aspect-ratio HSQ pillars. The HSQ pillars self-assembled by the capillary force during the post-development solvent drying process.

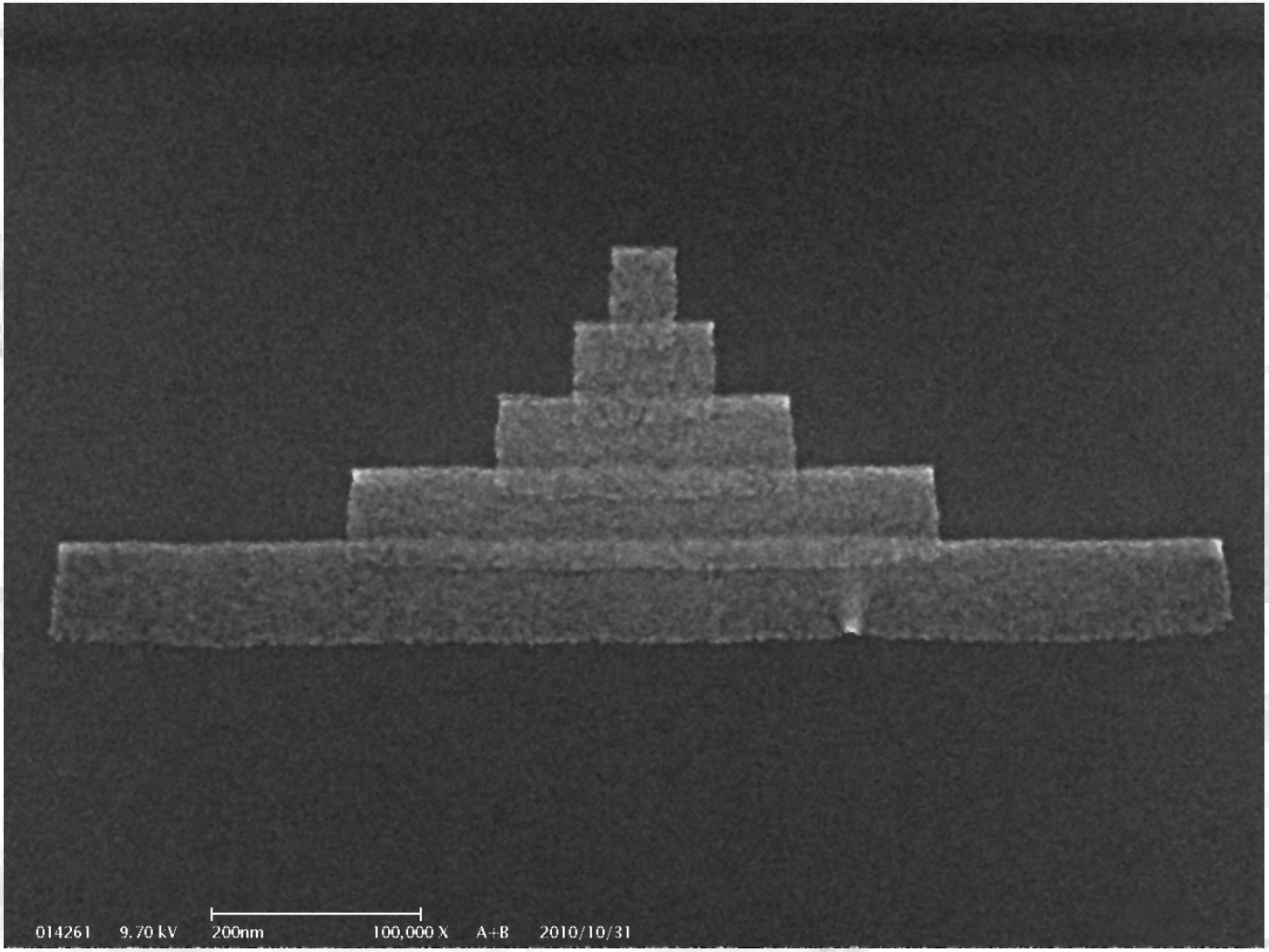
Magnification (3"x4" image): 80,000
Submitted by: Huigao Duan

Instrument (Make and Model): Elionix ESM 9000
Affiliation: Institute of Materials Research and Engineering, Singapore

2011 EIPBN MicroGraph Contest

Micrograph Title:
Nano Tian'an men built with 5-nm-thick sheets

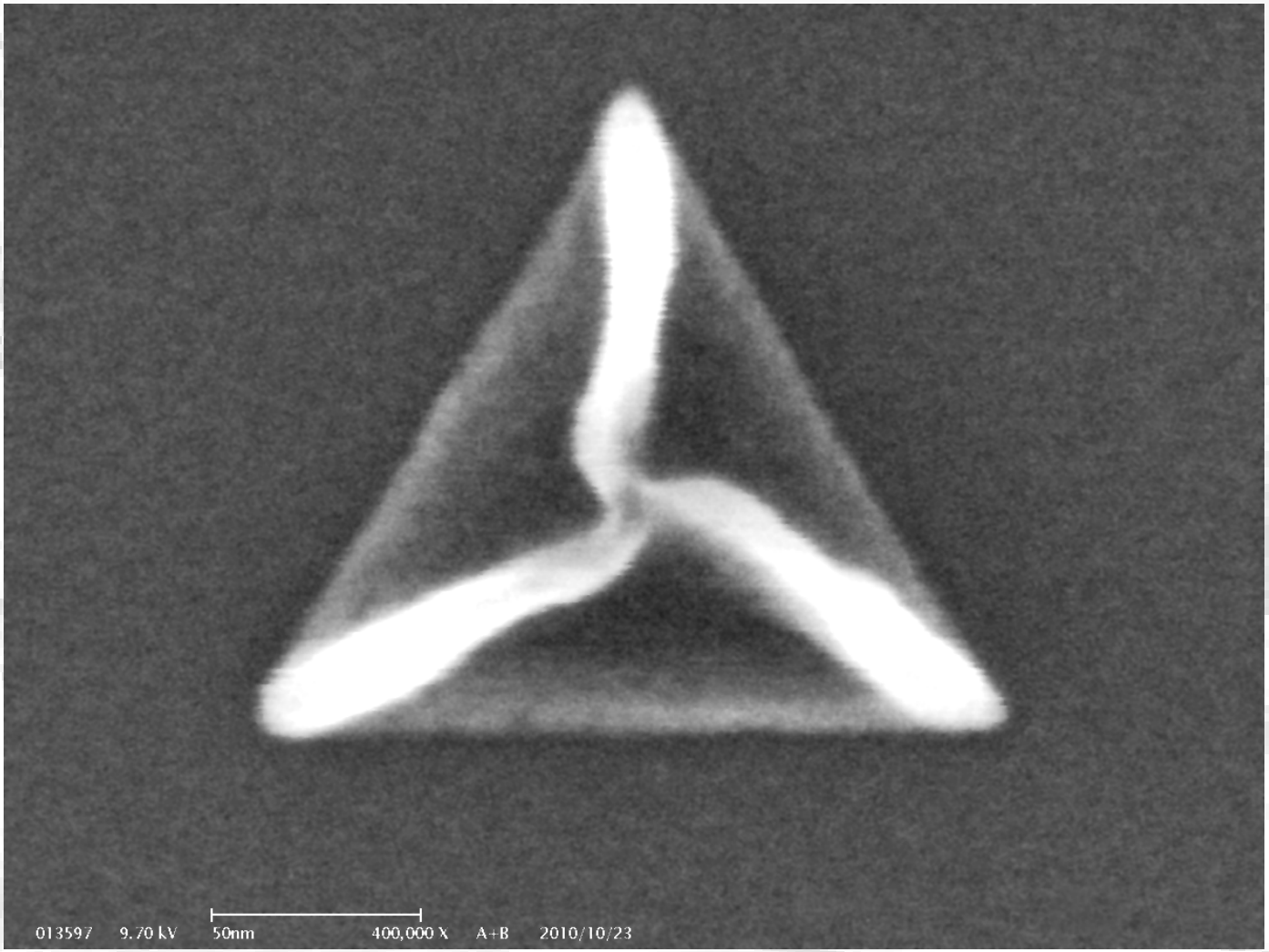
Description:
A SEM image of a building built from 5-nm-thick HSQ sheets. These ultrathin HSQ sheets are collapsed high-aspect-ratio HSQ fences fabricated with electron-beam lithography. Because of the asymmetric capillary force, these ultrathin fences collapsed to the same direction orchestrally and touched each other.



Magnification (3"x4" image): **100,000**
Submitted by: **Huigao Duan**

Instrument (Make and Model): **Elionix ESM 9000**
Affiliation: **Institute of Materials Research and Engineering, Singapore**

2011 EIPBN MicroGraph Contest



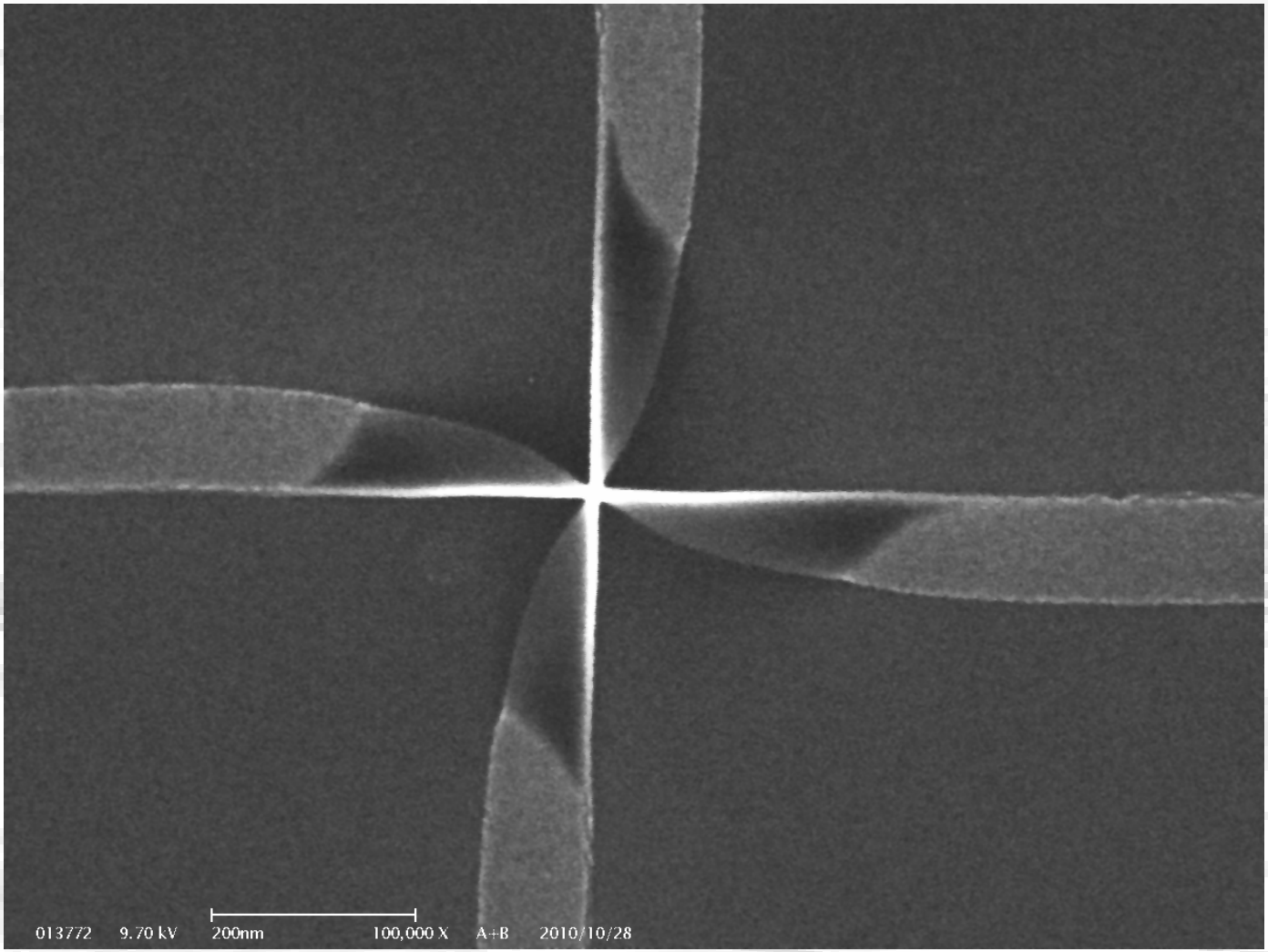
Micrograph Title:
A trianglar nanocapsule

Description:
A SEM image of an assemble formed from 3 adhered ultrathin HSQ sheets. The adhesion between the sheets was caused by the cohesion force during the drying process.

Magnification (3"x4" image): **400,000**
Submitted by: **Huigao Duan**

Instrument (Make and Model): **Elionix ESM 9000**
Affiliation: **Institute of Materials Research and Engineering, Singapore**

2011 EIPBN MicroGraph Contest



Micrograph Title:
A nanowindmill

Description:
A SEM image of partially collapse of two crossed HSQ nanowalls, showing the art of nanocollapse. The crossed part of these two nanowalls is more robust mechanically than the wings which have more freedom to collapse.

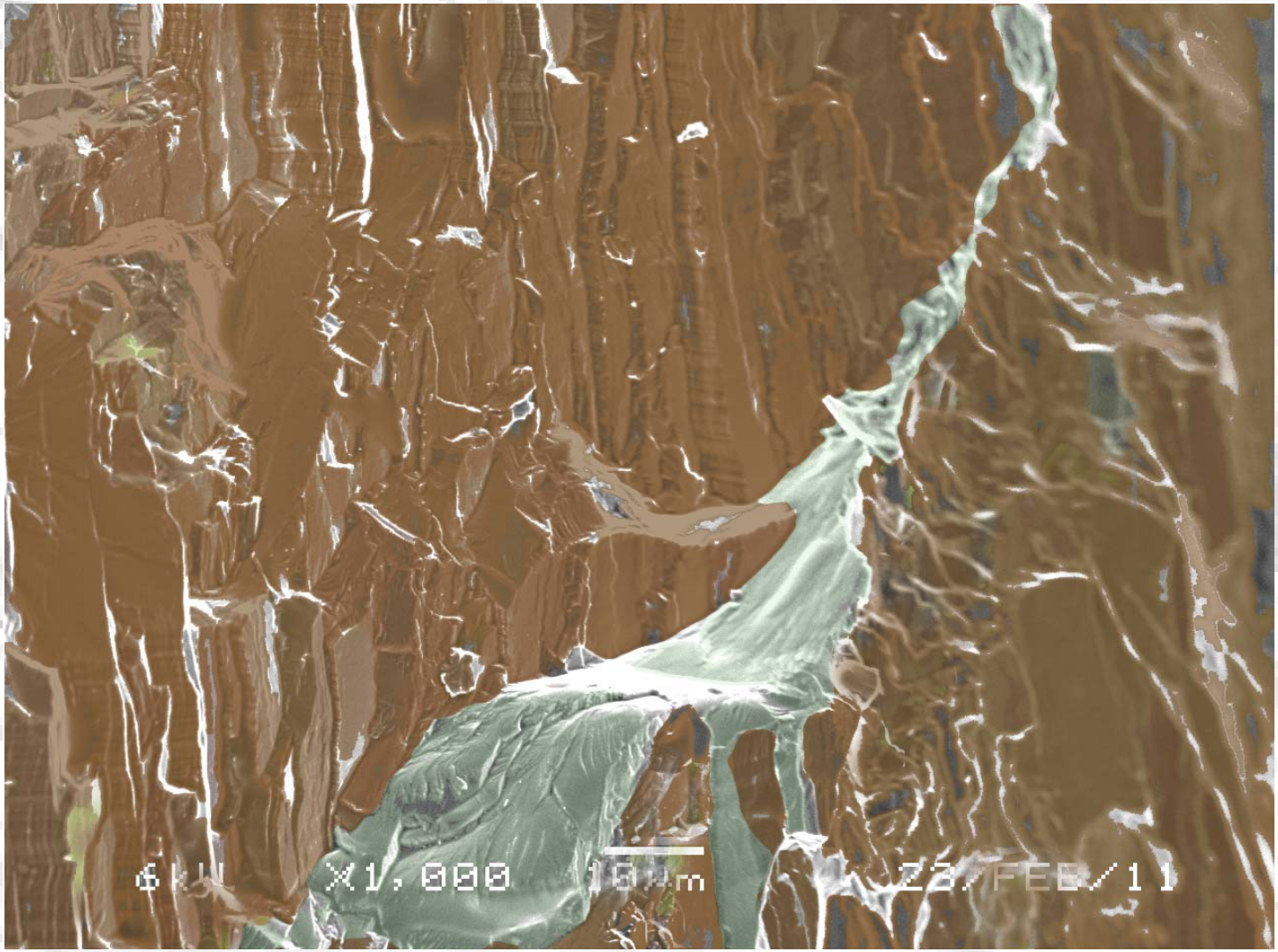
Magnification (3"x4" image): **100,000**
Submitted by: **Huigao Duan**

Instrument (Make and Model): **Elionix ESM 9000**
Affiliation: **Institute of Materials Research and Engineering, Singapore**

2011 EIPBN MicroGraph Contest

Micrograph Title: Mountain waterfall (tears of pain)

Description: a freactured calcium oxalate kidney stone



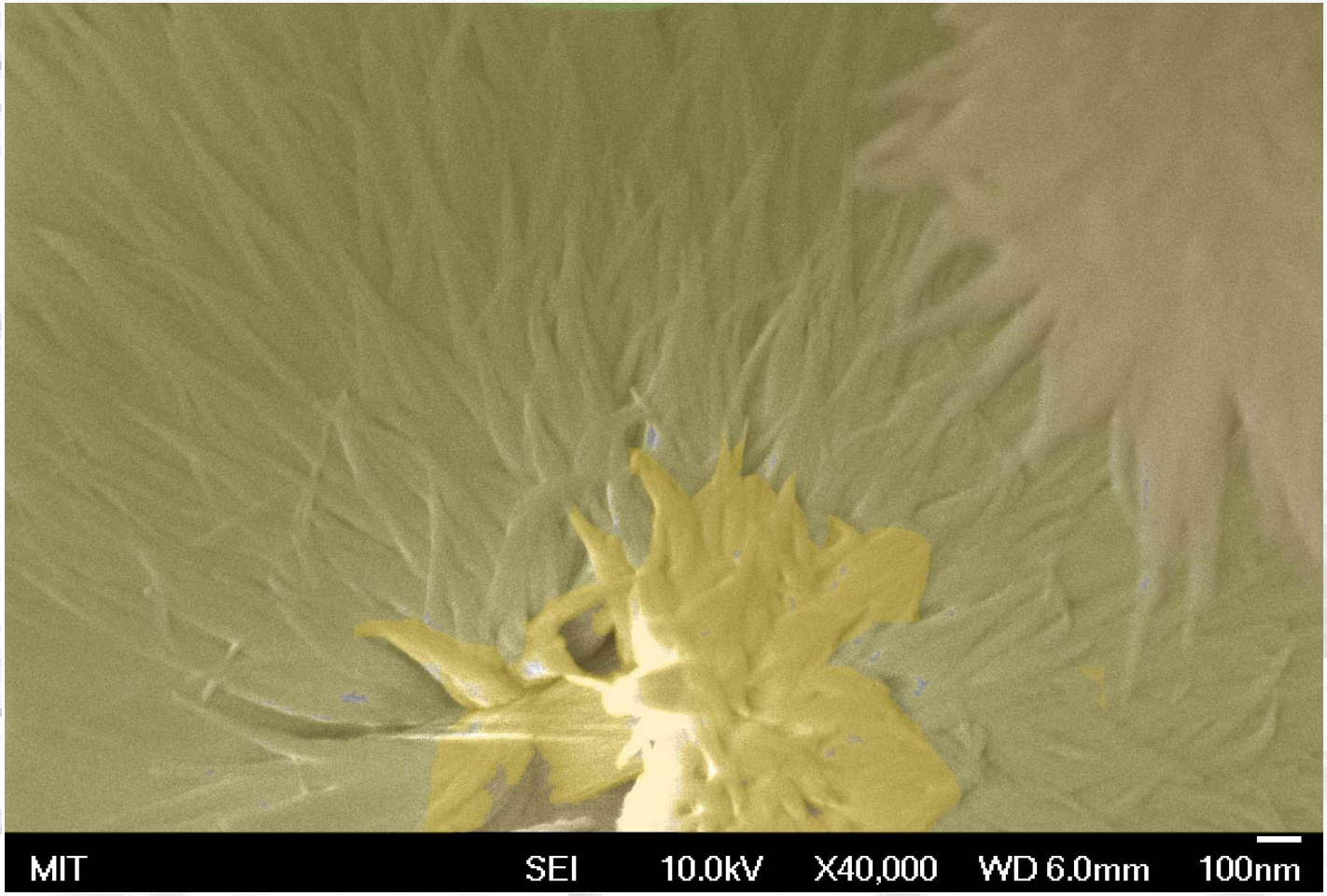
Magnification (3"x4" image):

Submitted by: Hank Smith, Sisi Ni

Instrument (Make and Model): JEOL SEM, 6700

Affiliation: MIT

2011 EIPBN MicroGraph Contest



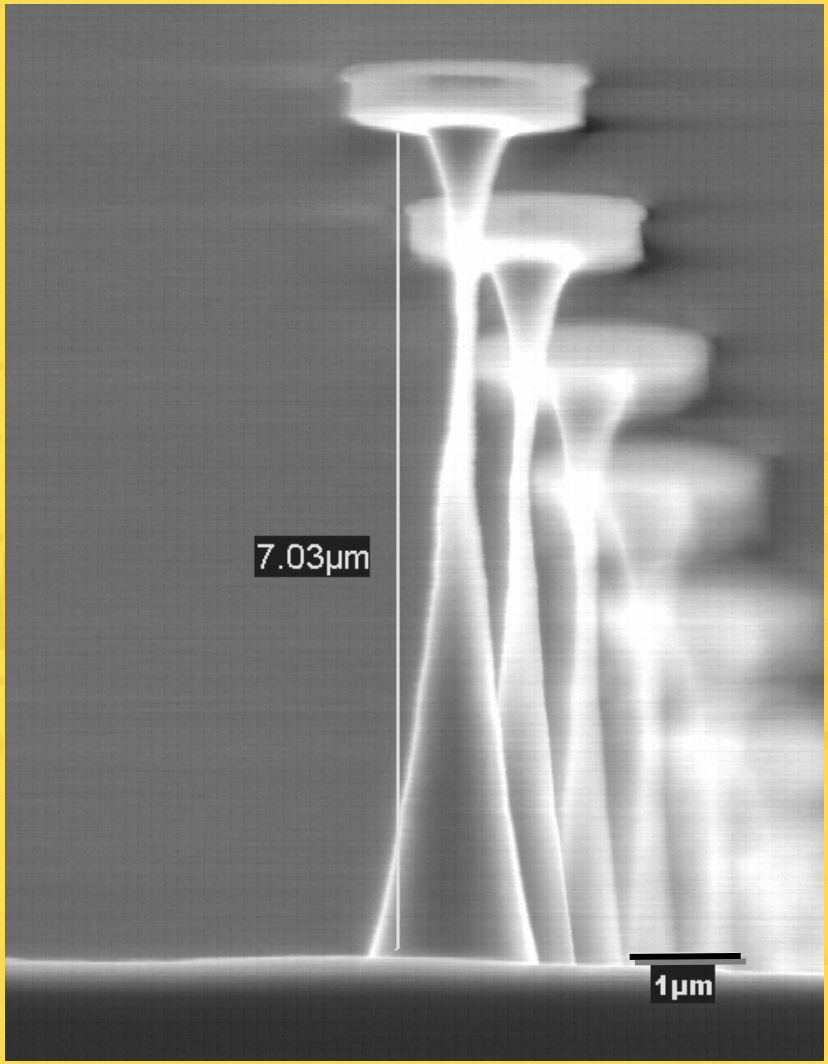
Micrograph Title: flower of pain

Description: surface of calcium oxalate kidney stone

Magnification (3"x4" image):
Submitted by: Hank Smith, Sisi Ni

Instrument: SEM, JEOL 6700
Affiliation: MIT

2011 EIPBN MicroGraph Contest



Micrograph Title: Seattle Needle Tower/UFO landing site.

Description: Cross sectioned and tilted image of pillars etched in silicon. Chrom/gold was used as mask.

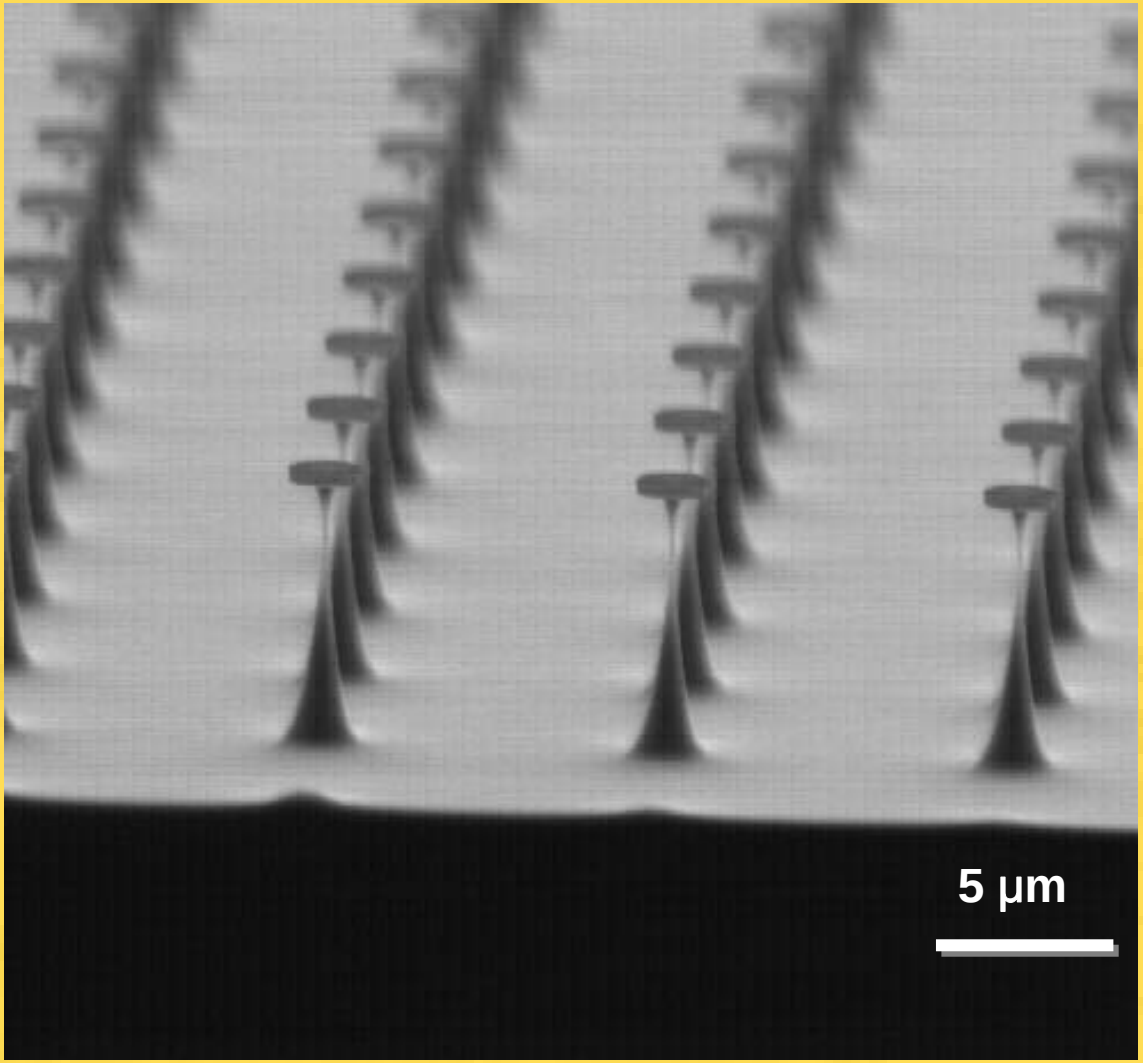
Magnification (3"x4" image): N/A
Submitted by: Anurag Mathur

Instrument (Make and Model): Hitachi S800
Affiliation: Columbia University

2011 EIPBN MicroGraph Contest

Micrograph Title:
Space ship launch station

Description:
Cross sectioned and tilted image of pillars etched in Silicon using chrome/gold as mask.



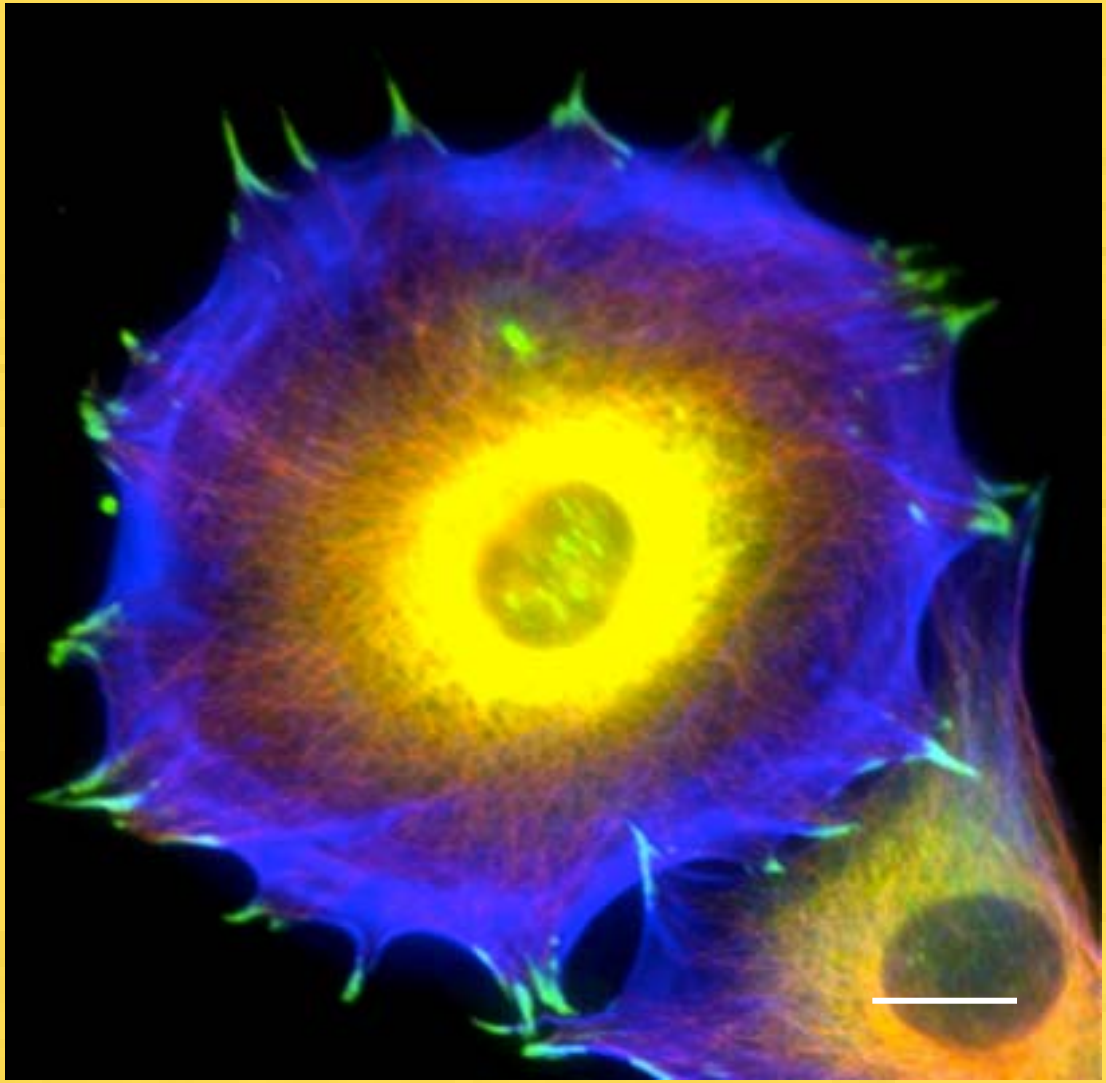
Magnification (3"x4" image): N/A
Submitted by: Anurag Mathur

Instrument (Make and Model): Hitachi S800
Affiliation: Columbia University

2011 EIPBN MicroGraph Contest

Micrograph Title:
The Sorcerer's Eye

Description:
Cell spreading on a flat substrates.



Magnification (3"x4" image): 40X
Submitted by: Anurag Mathur

Instrument (Make and Model): Olympus CKX41
Affiliation: Columbia University

2011 EIPBN MicroGraph Contest

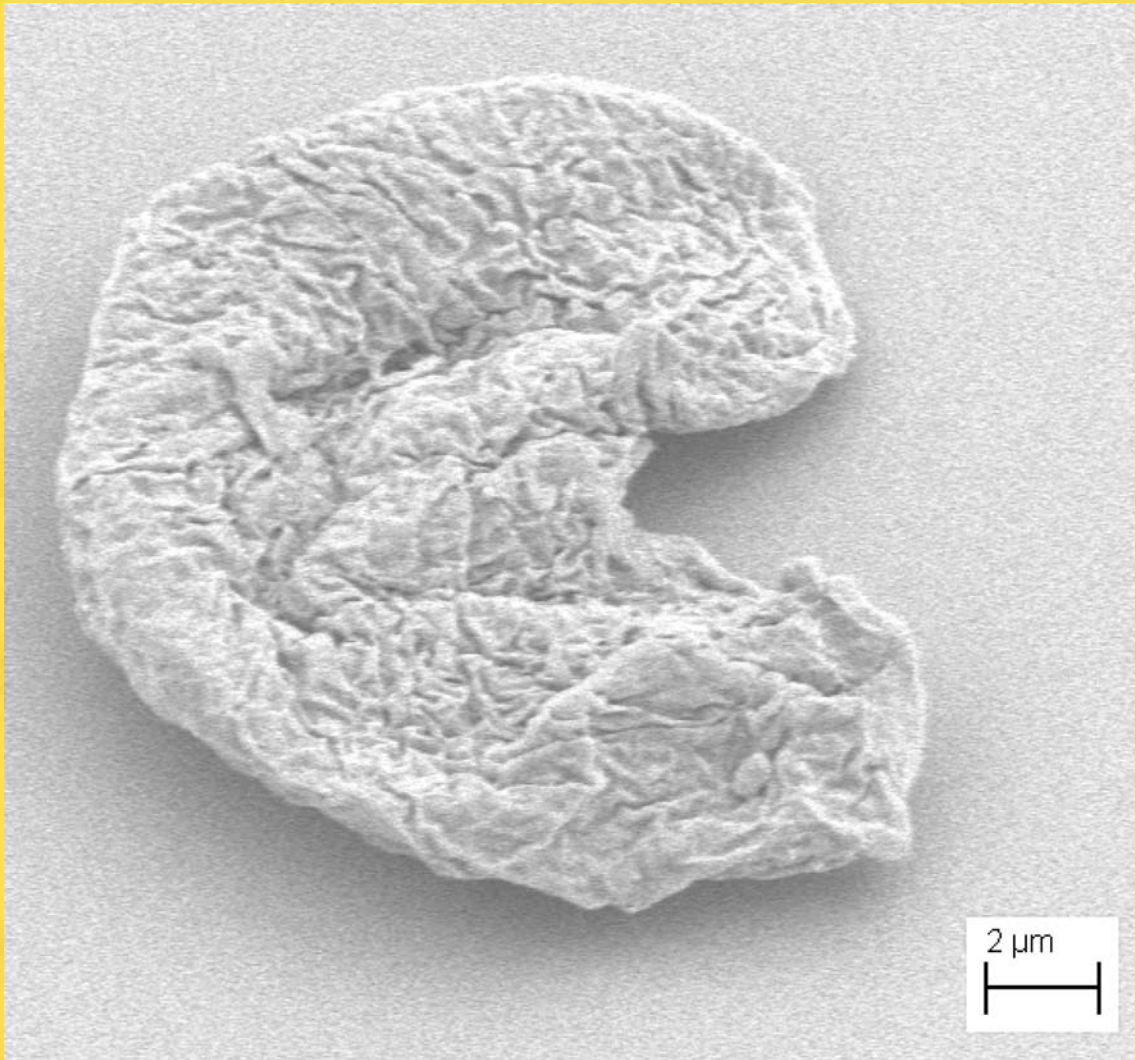
Micrograph Title:
Shoe of Cinderella

Description:
Cell spreading on grooves and ridges.

Magnification (3"x4" image): 40X
Submitted by: Anurag Mathur

Instrument (Make and Model): Olympus CKX41
Affiliation: Columbia University

2011 EIPBN MicroGraph Contest



Micrograph Title:
Micro Kidney

Description:
Some dirt that looked liked kidney.

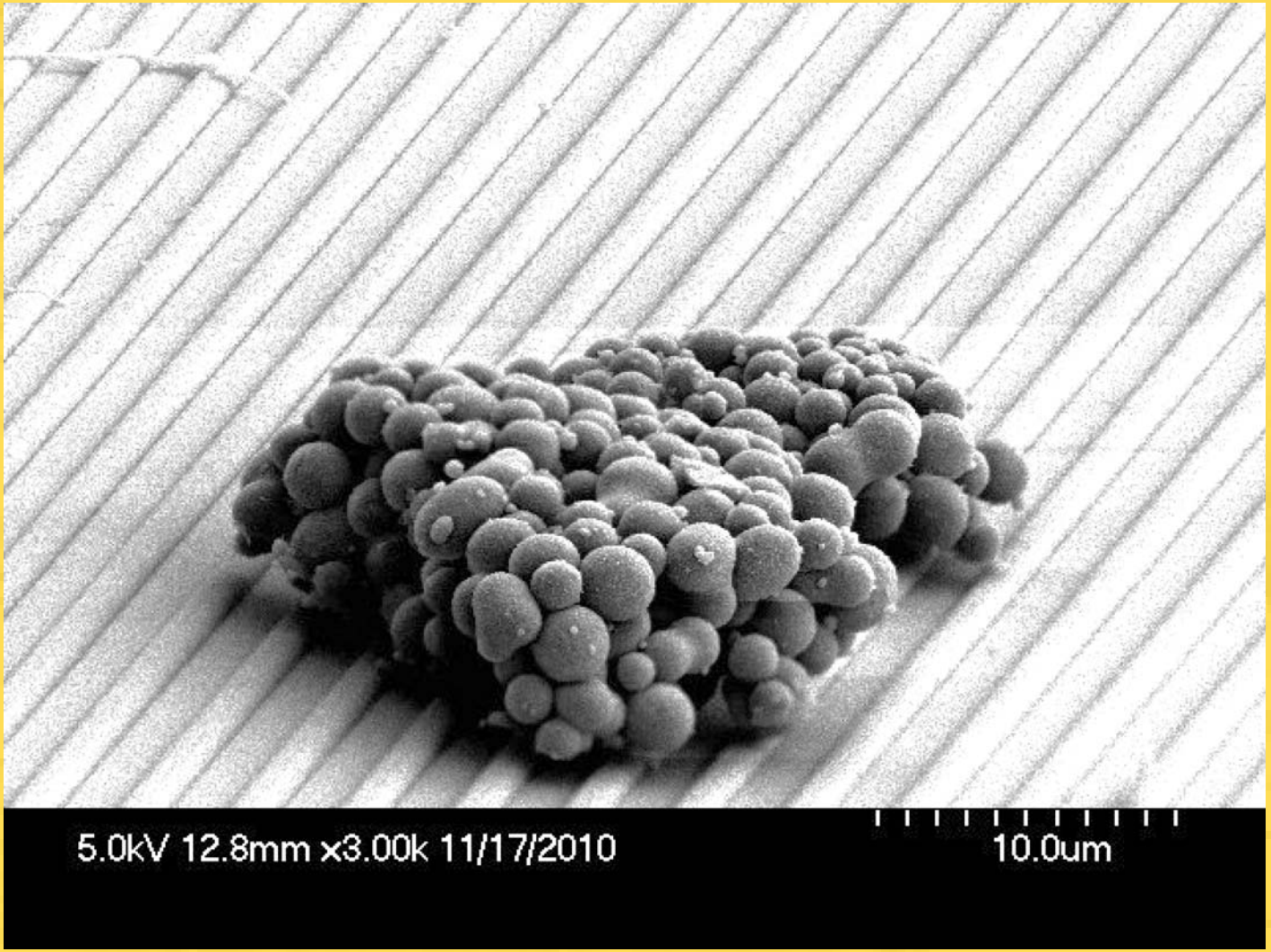
Magnification (3"x4" image): 10.33 KX
Submitted by: Anurag Mathur

Instrument (Make and Model): Zeiss Ultra 55
Affiliation: Columbia University

2011 EIPBN MicroGraph Contest

Micrograph Title:
A bunch of micro grapes

Description:
Bacterial growth on grooves and ridges which were being used for cell spreading.



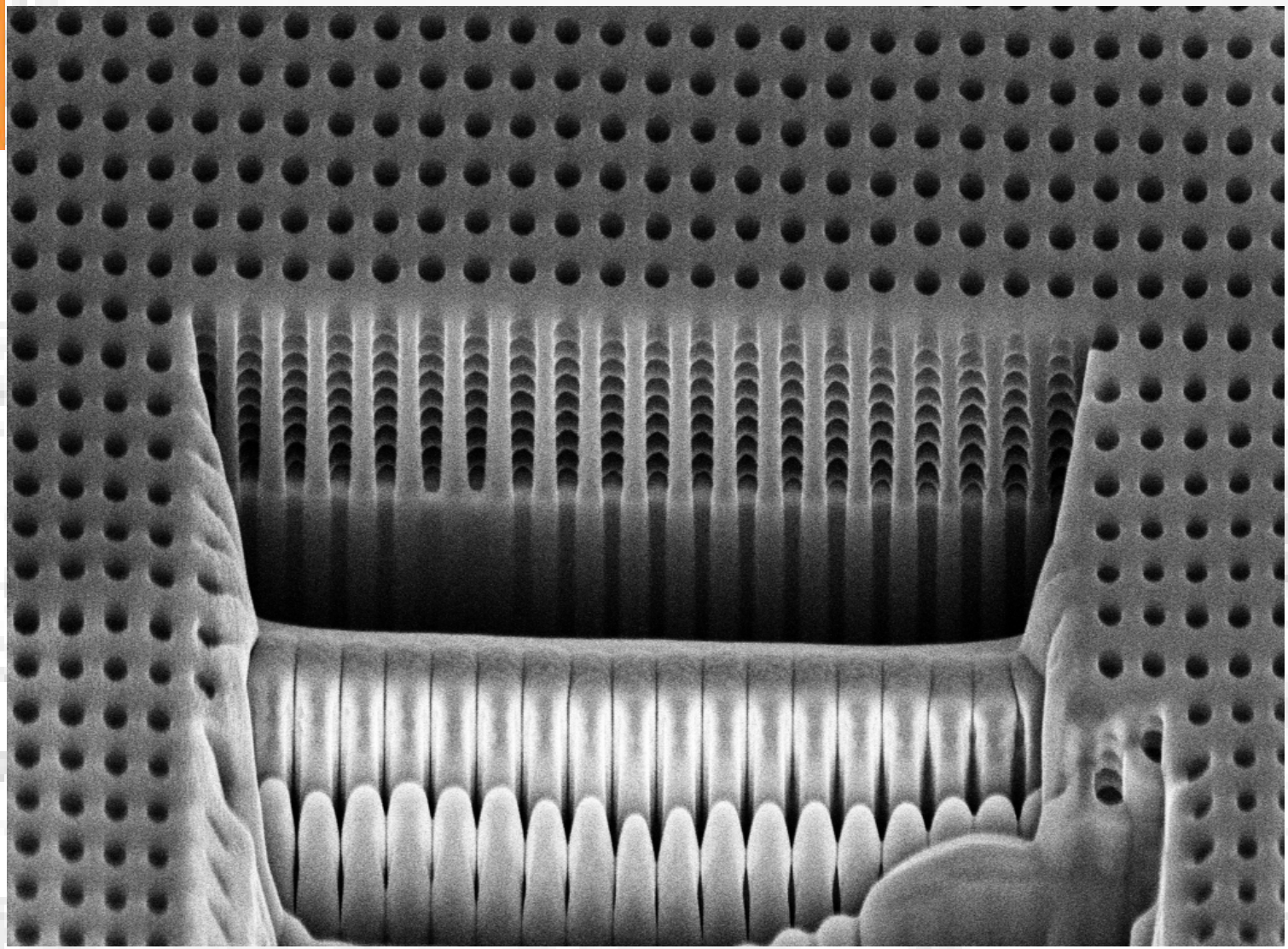
Magnification (3"x4" image): 3KX
Submitted by: Anurag Mathur

Instrument (Make and Model): Zeiss Ultra 55
Affiliation: Columbia University

2011 EIPBN MicroGraph Contest

Micrograph Title: Mining Wells

Description: Porous photoresist features on silicon substrate.



Magnification (3"x4" image): 17K

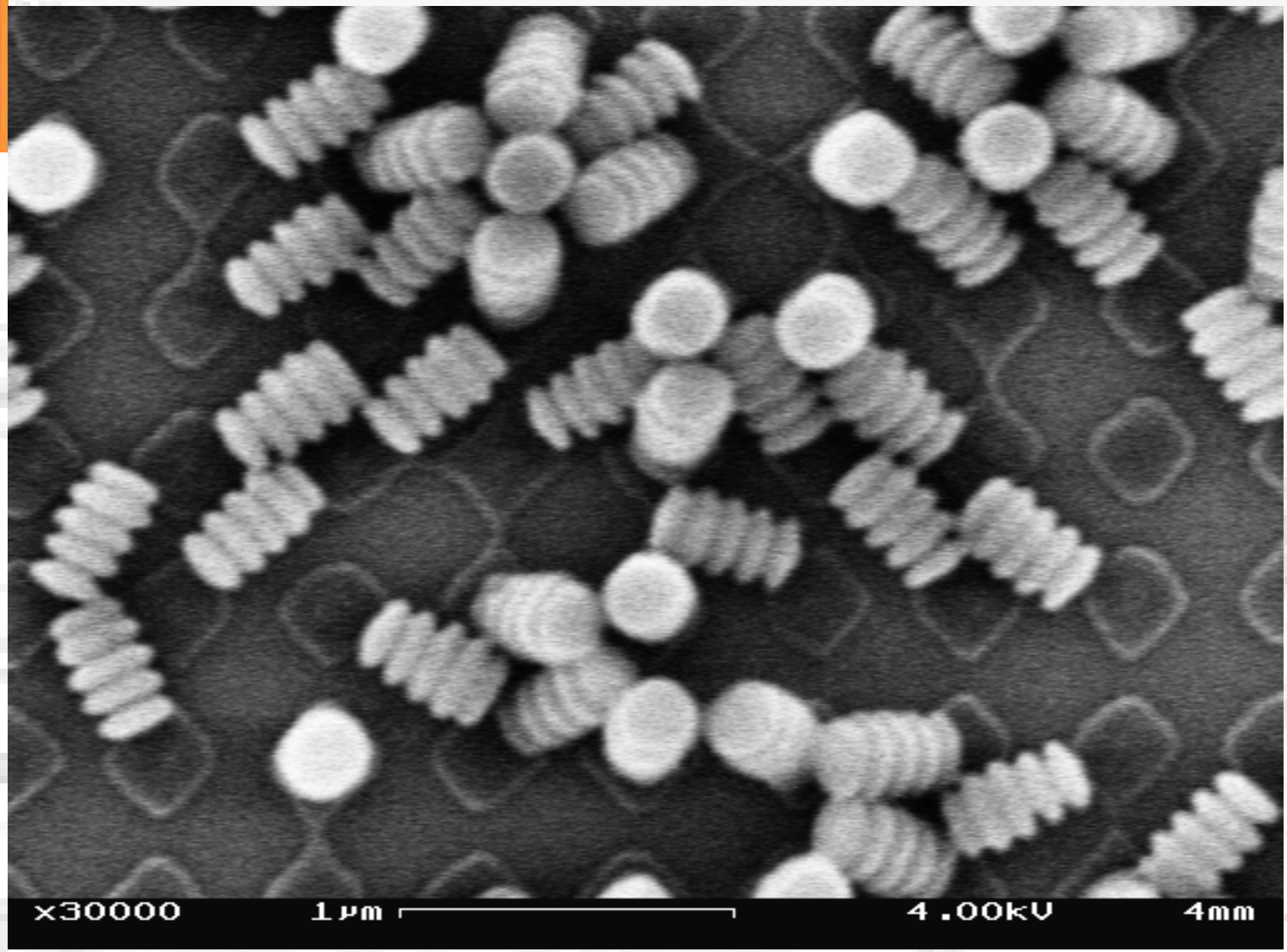
Instrument (Make and Model): Zeiss Auriga FIB-SEM

Submitted by: Ishan Wathuthanthri and Chang-Hwan Choi
Affiliation: Stevens Institute of Technology

2011 EIPBN MicroGraph Contest

Micrograph Title: Pasta and a Wafer

Description: Photoresist pillar structures that collapsed during development.



Magnification (3"x4" image): 30K

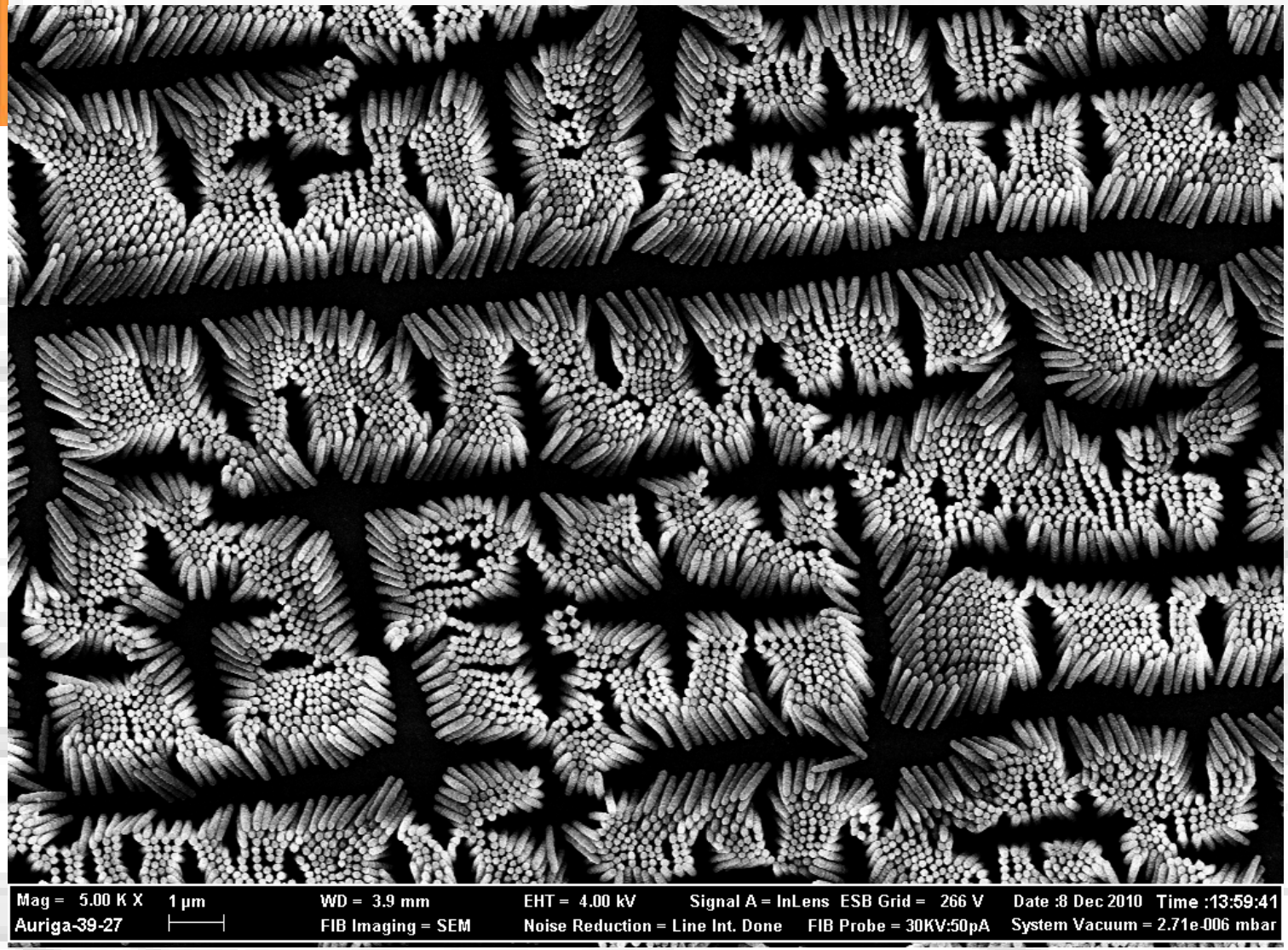
Instrument (Make and Model): Zeiss LEO 982 FE-SEM

Submitted by: Ishan Wathuthanthri and Chang-Hwan Choi
Affiliation: Stevens Institute of Technology

2011 EIPBN MicroGraph Contest

Micrograph Title:
The Maze

Description:
Photoresist pillars bundling together forming a maze.



Magnification (3"x4" image): 5K

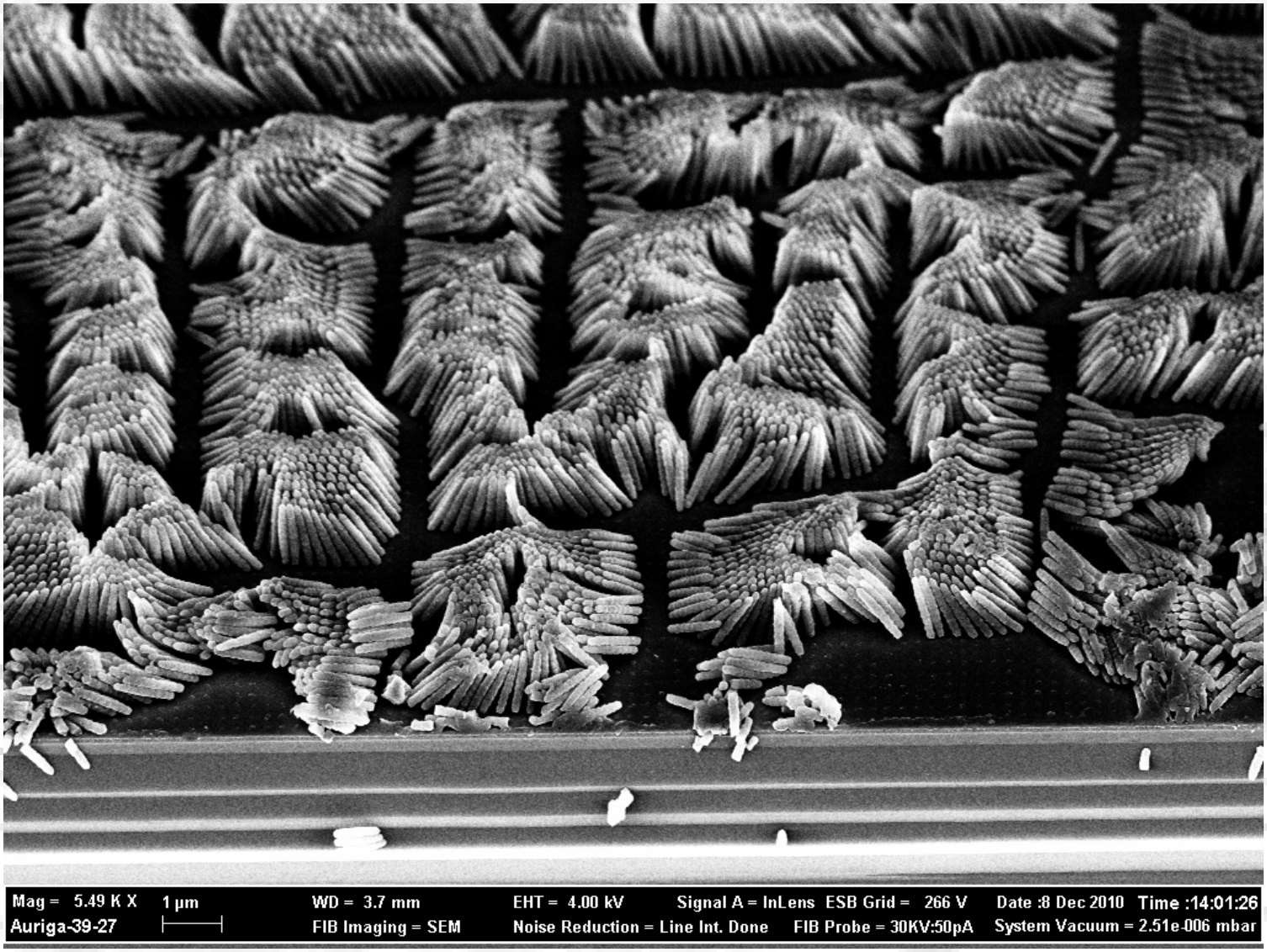
Instrument (Make and Model): Zeiss Auriga FIB-SEM

Submitted by: Ishan Wathuthanthri and Chang-Hwan Choi
Affiliation: Stevens Institute of Technology

2011 EIPBN MicroGraph Contest

Micrograph Title: Fields of Corn

Description: Cross sectional view of collapsed photoresist pillars



Magnification (3"x4" image): 5.5K

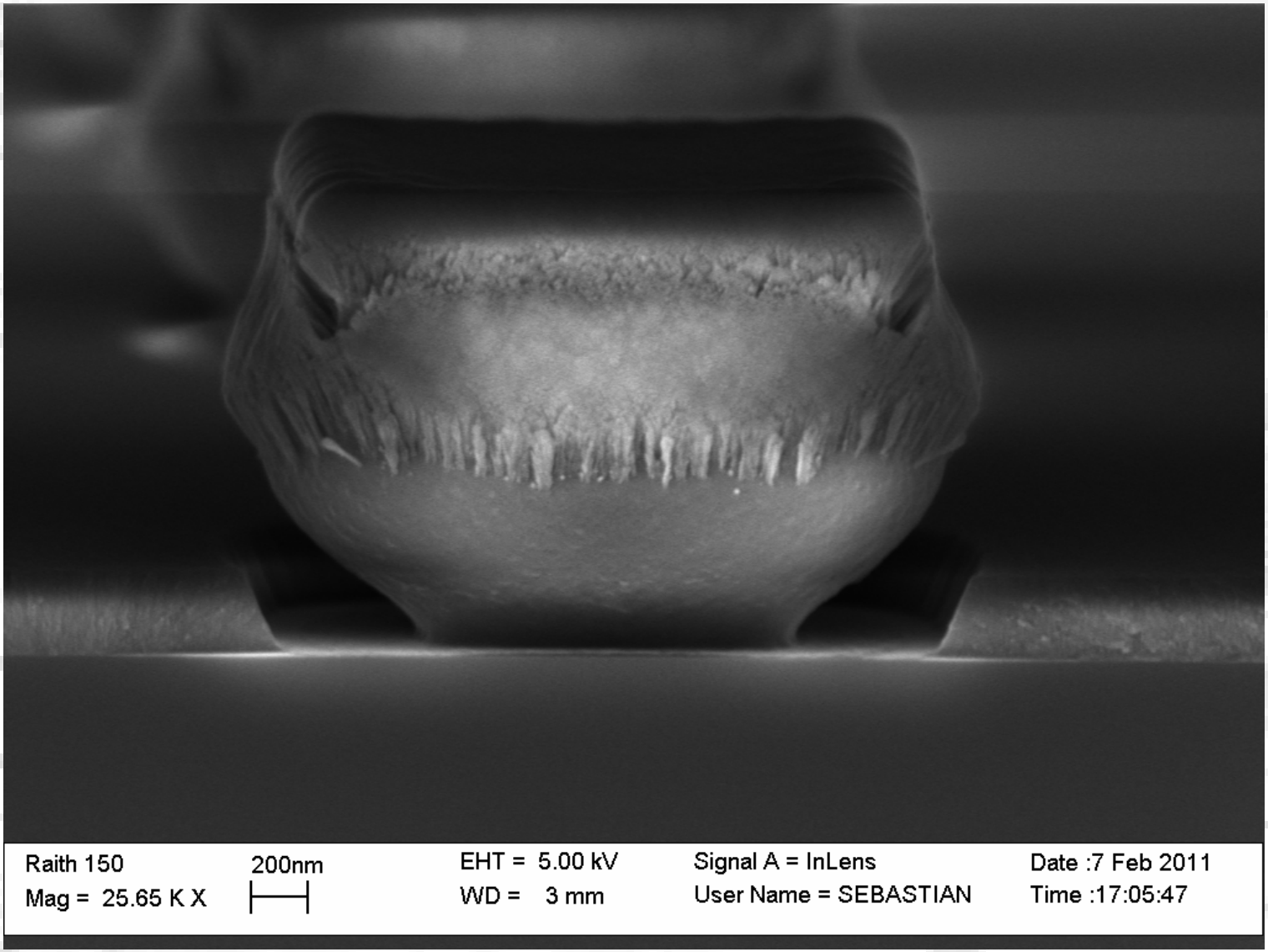
Instrument (Make and Model): Zeiss Auriga FIB-SEM

Submitted by: Ishan Wathuthanthri and Chang-Hwan Choi
Affiliation: Stevens Institute of Technology

2011 EIPBN MicroGraph Contest

Micrograph Title: Crocodile Dundee

Description: Negative resist exposed by – beam and covered by aluminum oxide



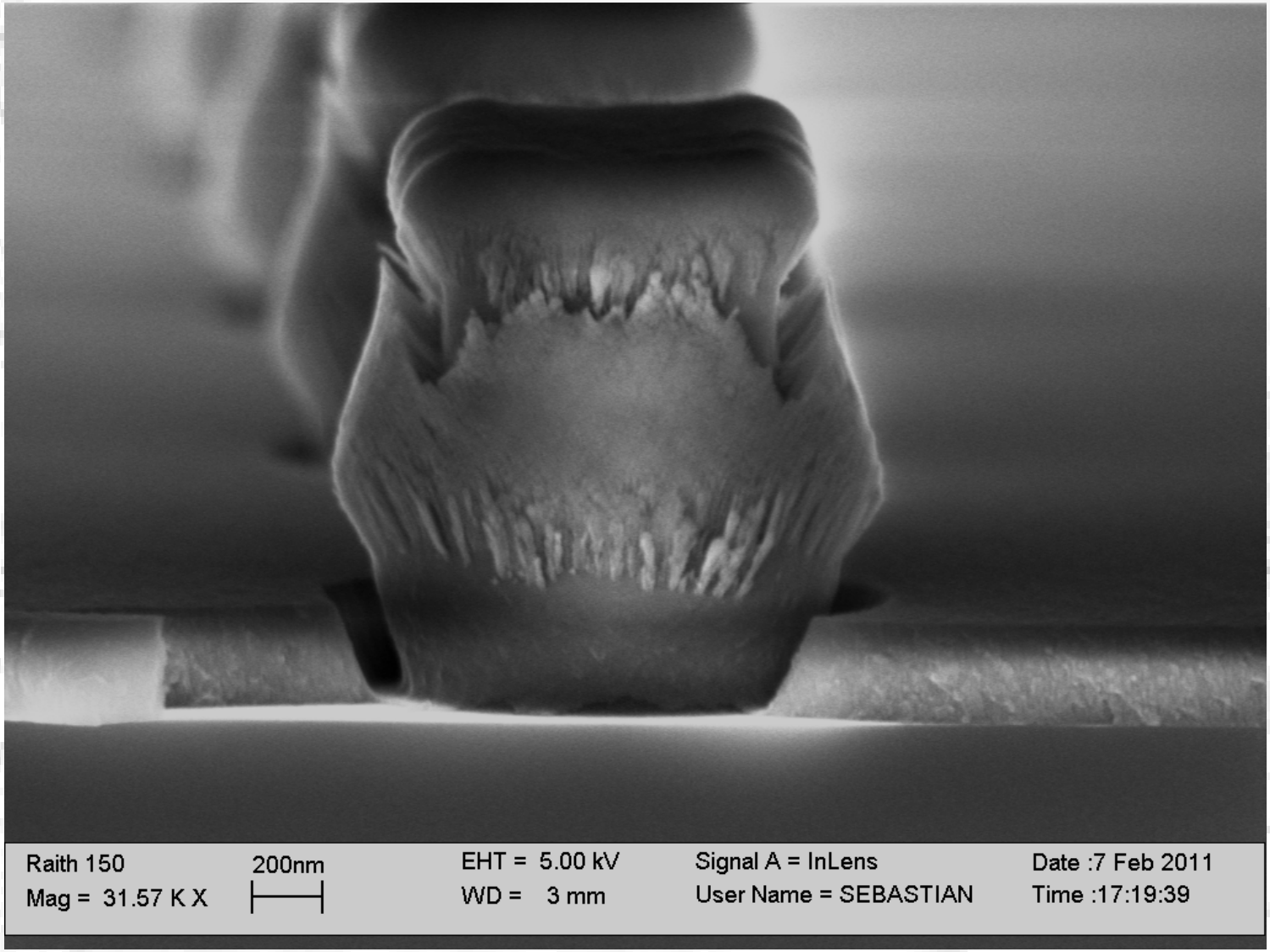
Magnification (3"x4" image): 25’600X
Submitted by: Sebastian Gautsch

Instrument (Make and Model): Raith 150
Affiliation: EPFL Switzerland

2011 EIPBN MicroGraph Contest

Micrograph Title: T-Rex

Description: Negative resist exposed by – beam and covered by aluminum oxide



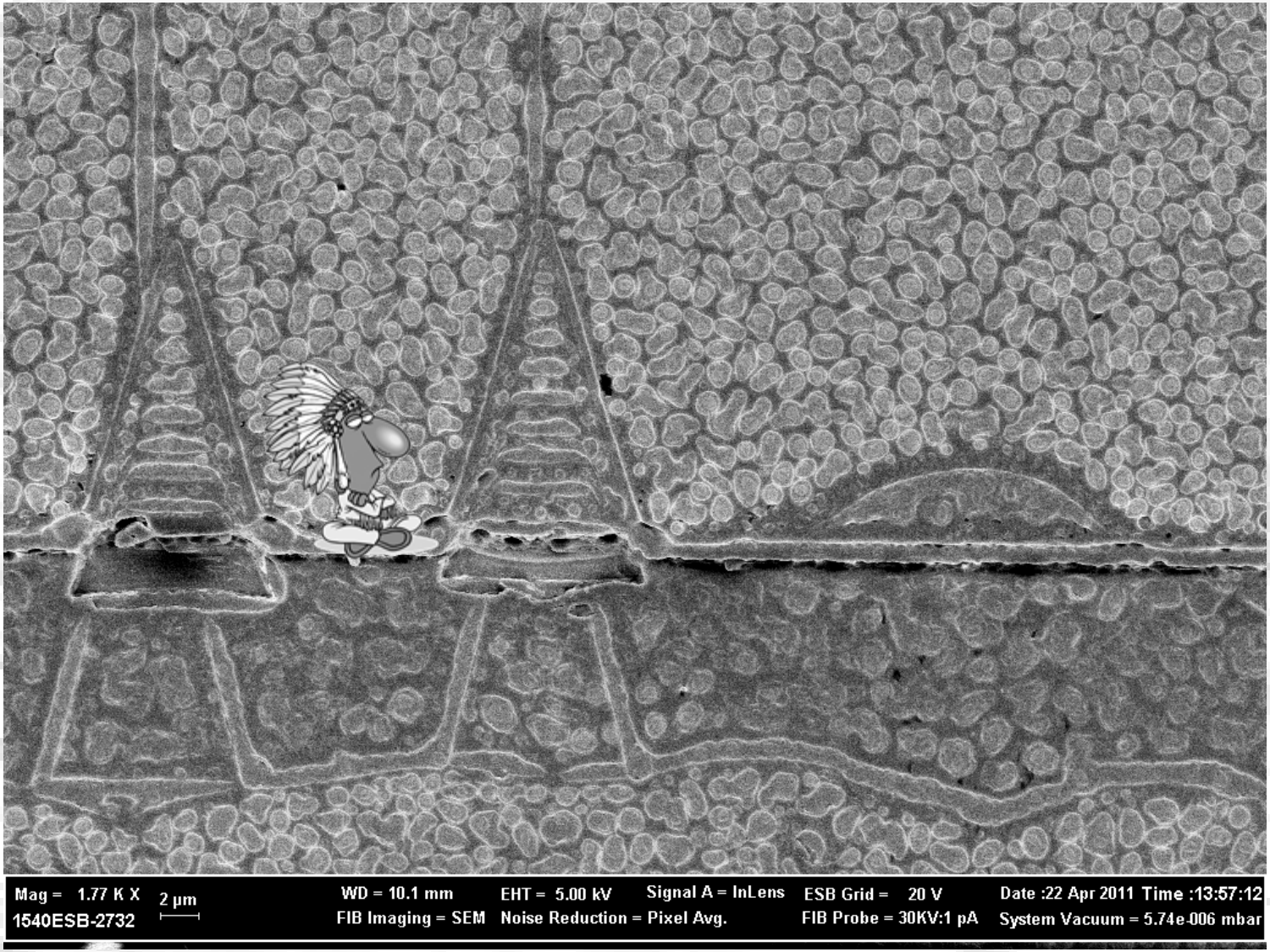
Magnification (3"x4" image): 31’500X
Submitted by: Sebastian Gautsch

Instrument (Make and Model): Raith 150
Affiliation: EPFL Switzerland

2011 EIPBN MicroGraph Contest

Micrograph Title: Indian Landscape, with river and sunset

Description: Failed deposition of a silane monolayer, that created clusters on the sample´s surface



Magnification (3"x4" image): 1.77 KX

Submitted by: Irene Fernandez-Cuesta

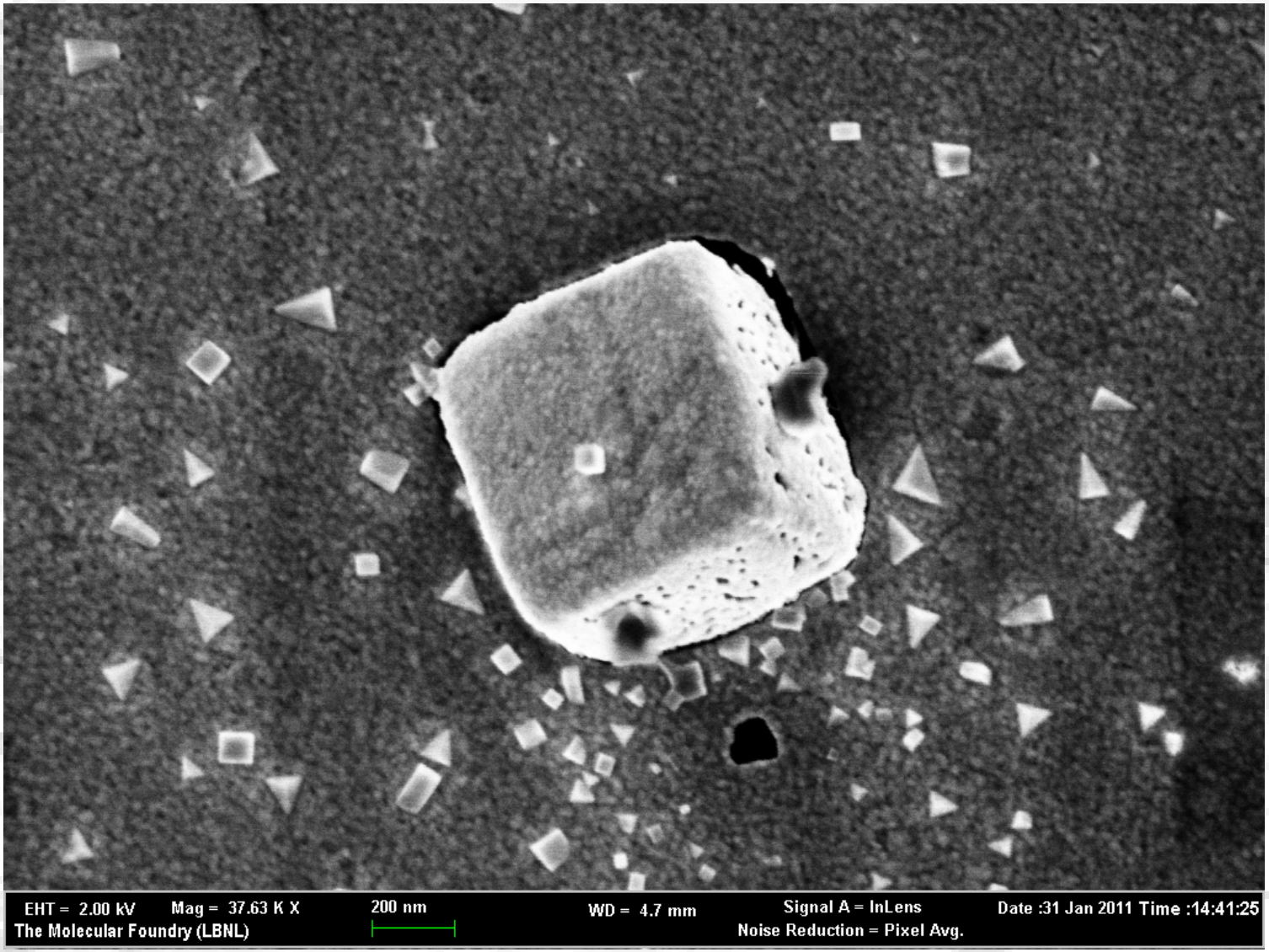
Instrument (Make and Model): Zeiss Cross Beam 1540

Affiliation: The Molecular Foundry (LBNL) & DTU Nanotech

2011 EIPBN MicroGraph Contest

Micrograph Title: Ace! I win!

Description: Aggregates of gold on a silicon/polymer sample after sputtering



Magnification (3"x4" image): 37KX

Submitted by: Irene Fernandez-Cuesta

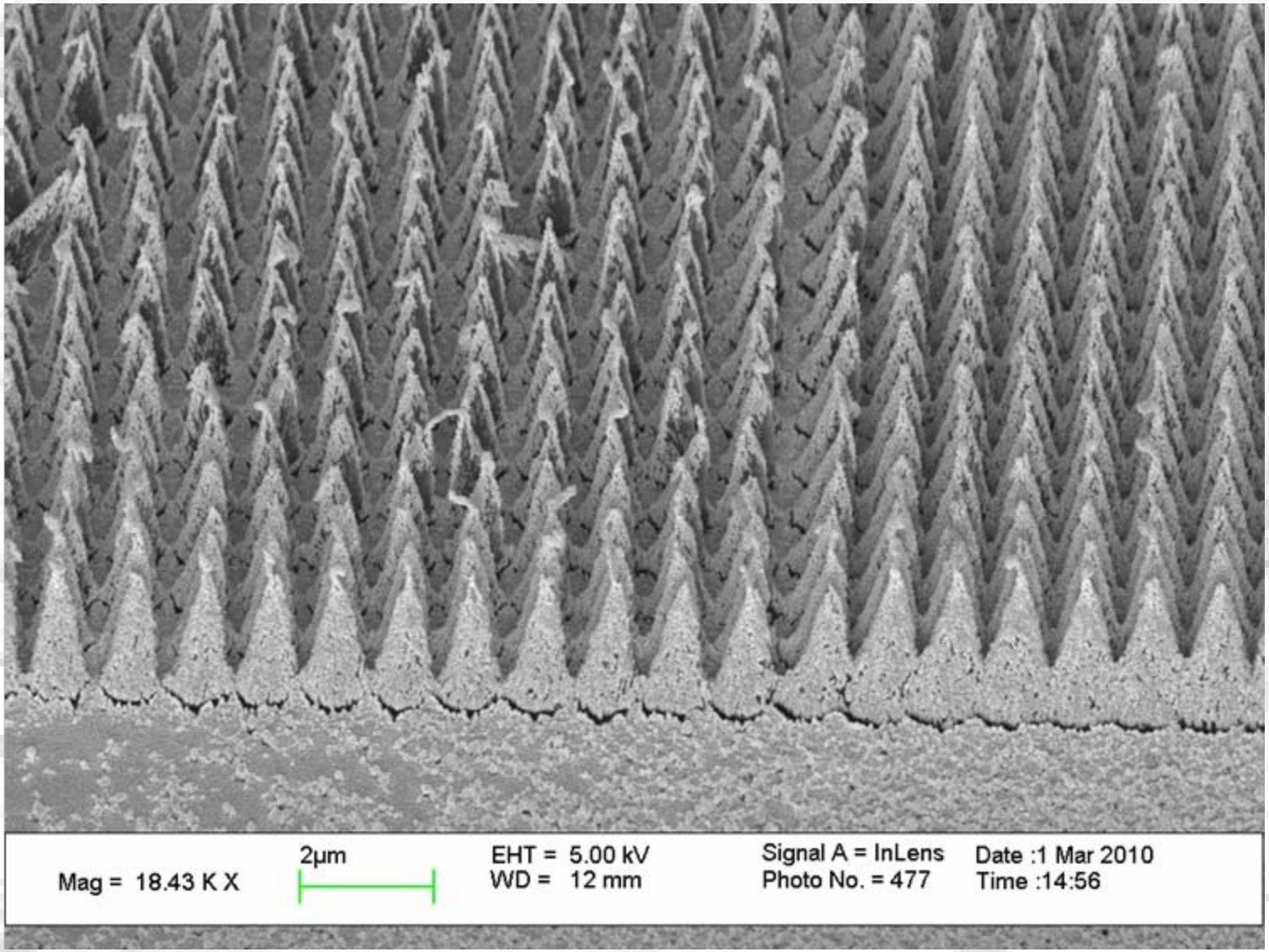
Instrument (Make and Model): SEM - LEO

Affiliation: The Molecular Foundry (LBNL) & DTU Nanotech

2011 EIPBN MicroGraph Contest

Micrograph Title: Summer in Lapland

Description: Gold on SU8 “pillars”.



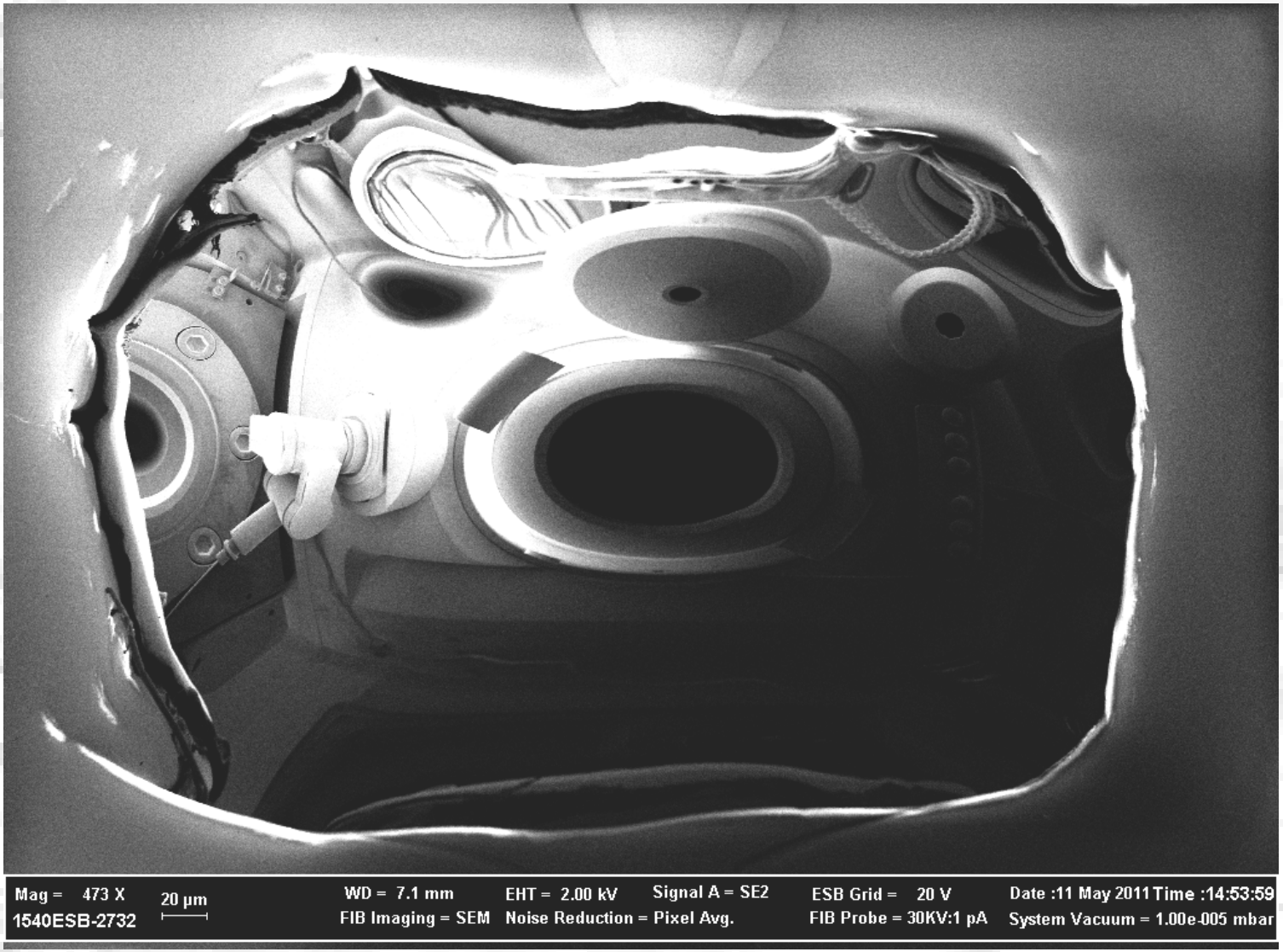
Magnification (3"x4" image): 18kX
Submitted by: Irene Fernandez-Cuesta

Instrument (Make and Model): SEM-LEO
Affiliation: DTU Nanotech & The Molecular Foundry (LBNL)

2011 EIPBN MicroGraph Contest

Micrograph Title: What you see before a cross-section

Description: Reflection of the FIB chamber on a burned area of the polymer surface



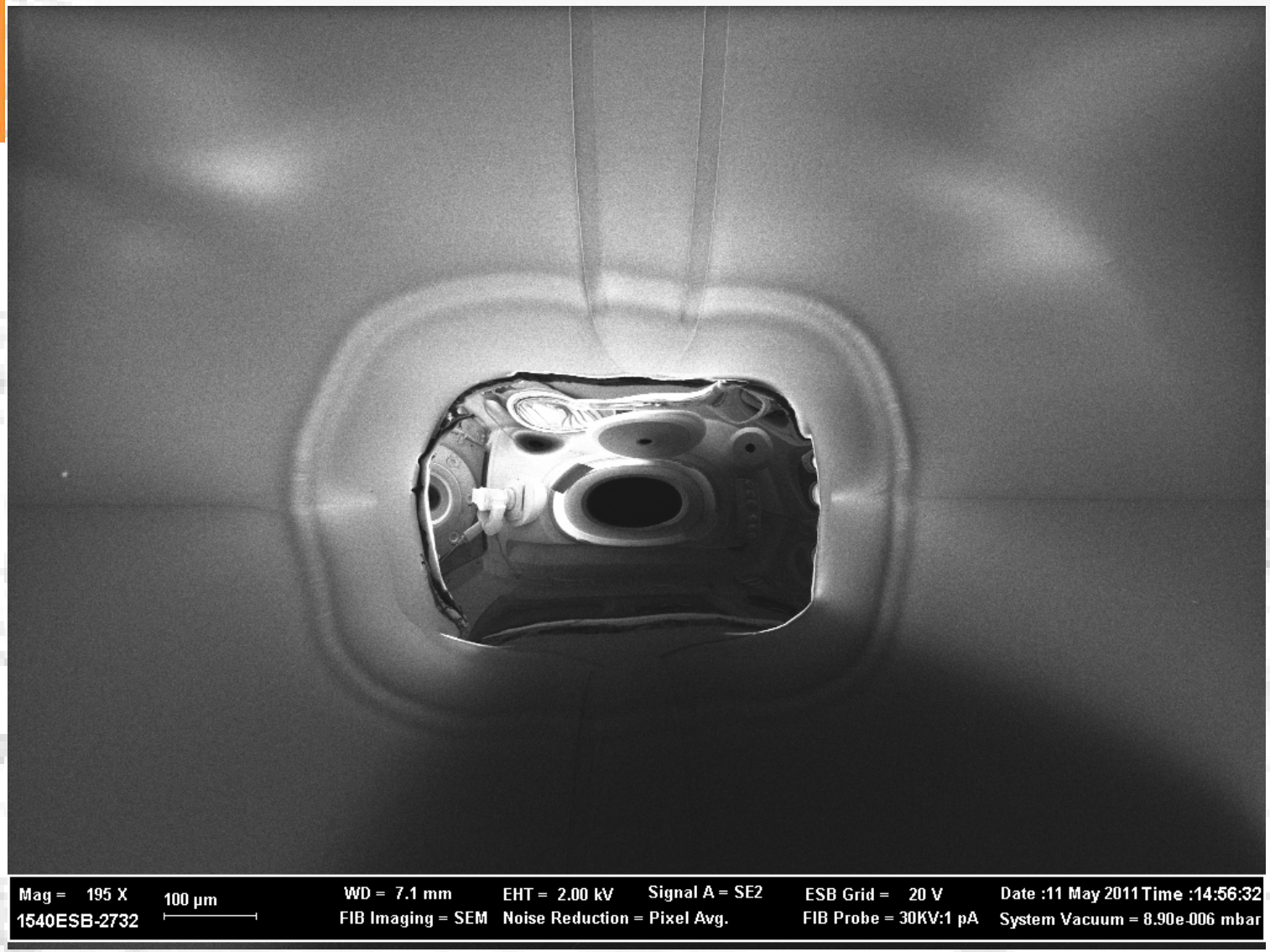
Magnification (3"x4" image): 473 KX
Submitted by: Irene Fernandez-Cuesta

Instrument (Make and Model): Zeiss Cross Beam 1540
Affiliation: The Molecular Foundry (LBNL) & DTU Nanotech

2011 EIPBN MicroGraph Contest

Micrograph Title: They are showing something funny on TV

Description: Reflection of the FIB chamber on a burned area of the polymer surface



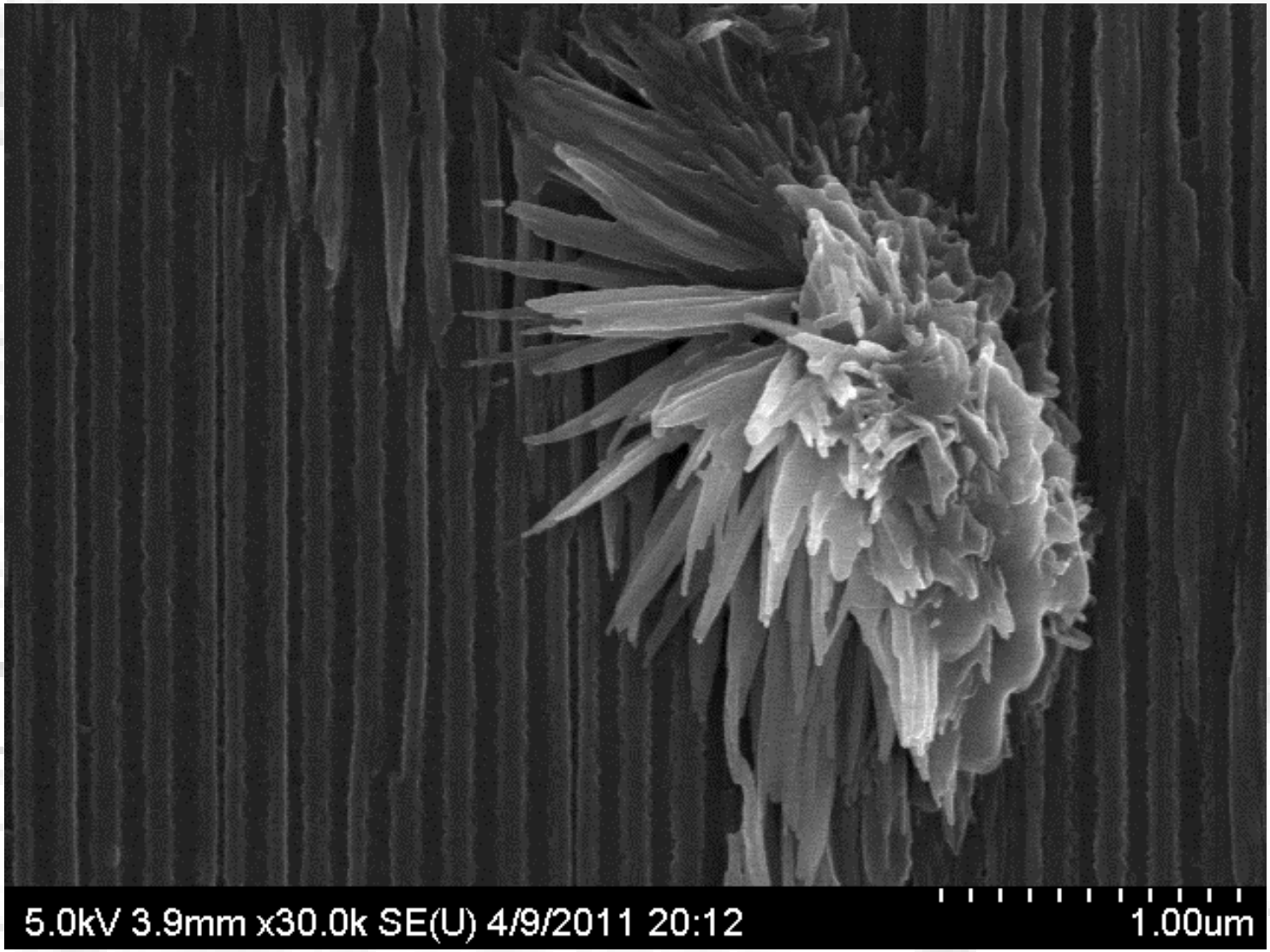
Magnification (3"x4" image): 473 KX
Submitted by: Irene Fernandez-Cuesta

Instrument (Make and Model): Zeiss Cross Beam 1540
Affiliation: The Molecular Foundry (LBNL) & DTU Nanotech

2011 EIPBN MicroGraph Contest

Micrograph Title:
Sea Anemone on Gratings

Description:
A particle that looks like an ocean creature – the sea anemone on collapsed ZEP gratings.



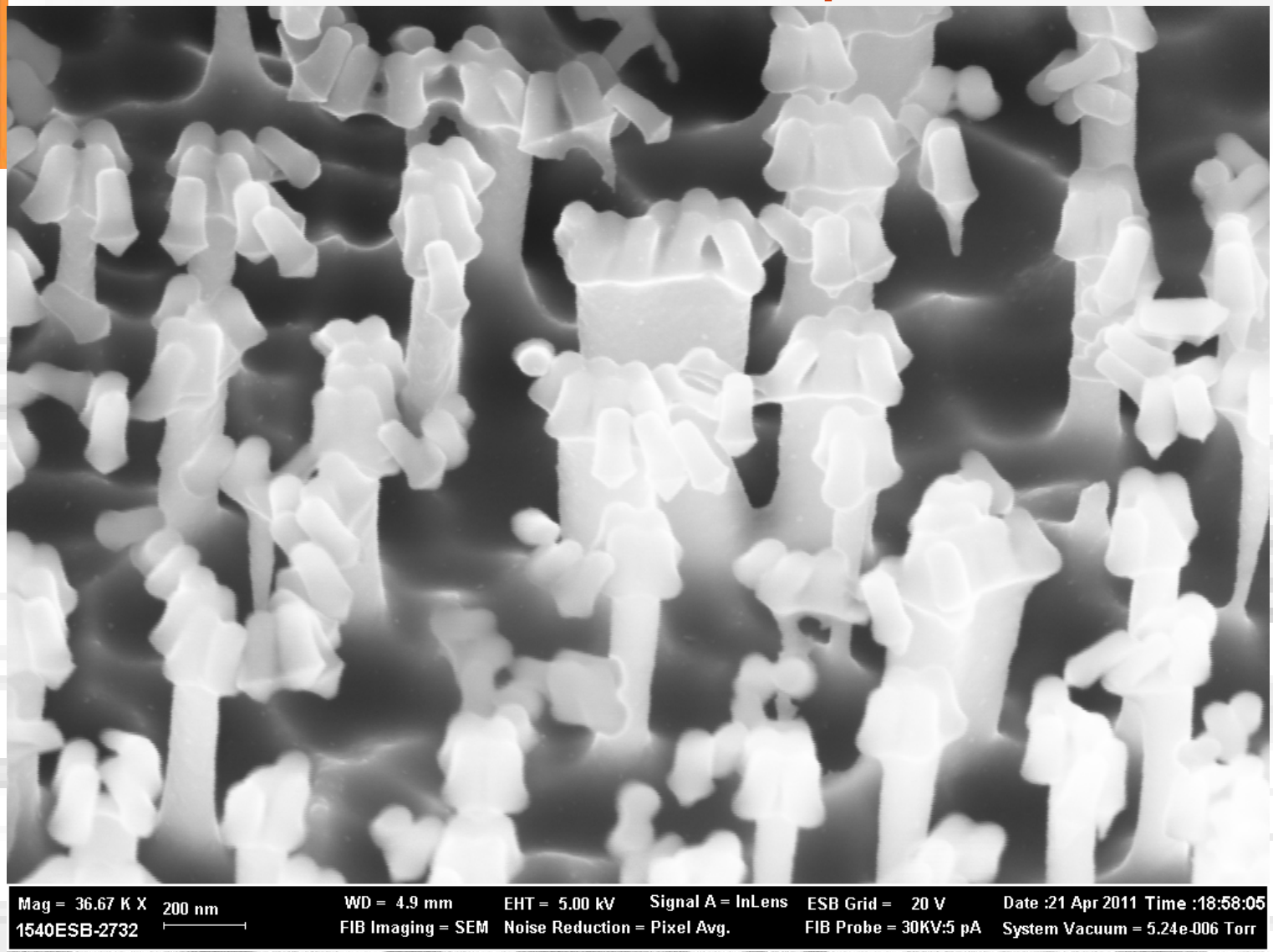
Magnification (3"x4" image): 30,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada

2011 EIPBN MicroGraph Contest

Micrograph Title:
Nano Garden

Description:
This Si structure is etched by ICP with falling ebeam resist mask



Magnification (3"x4" image): 36.67 K X **Instrument (Make and Model): Zeiss XB1540 EsB**

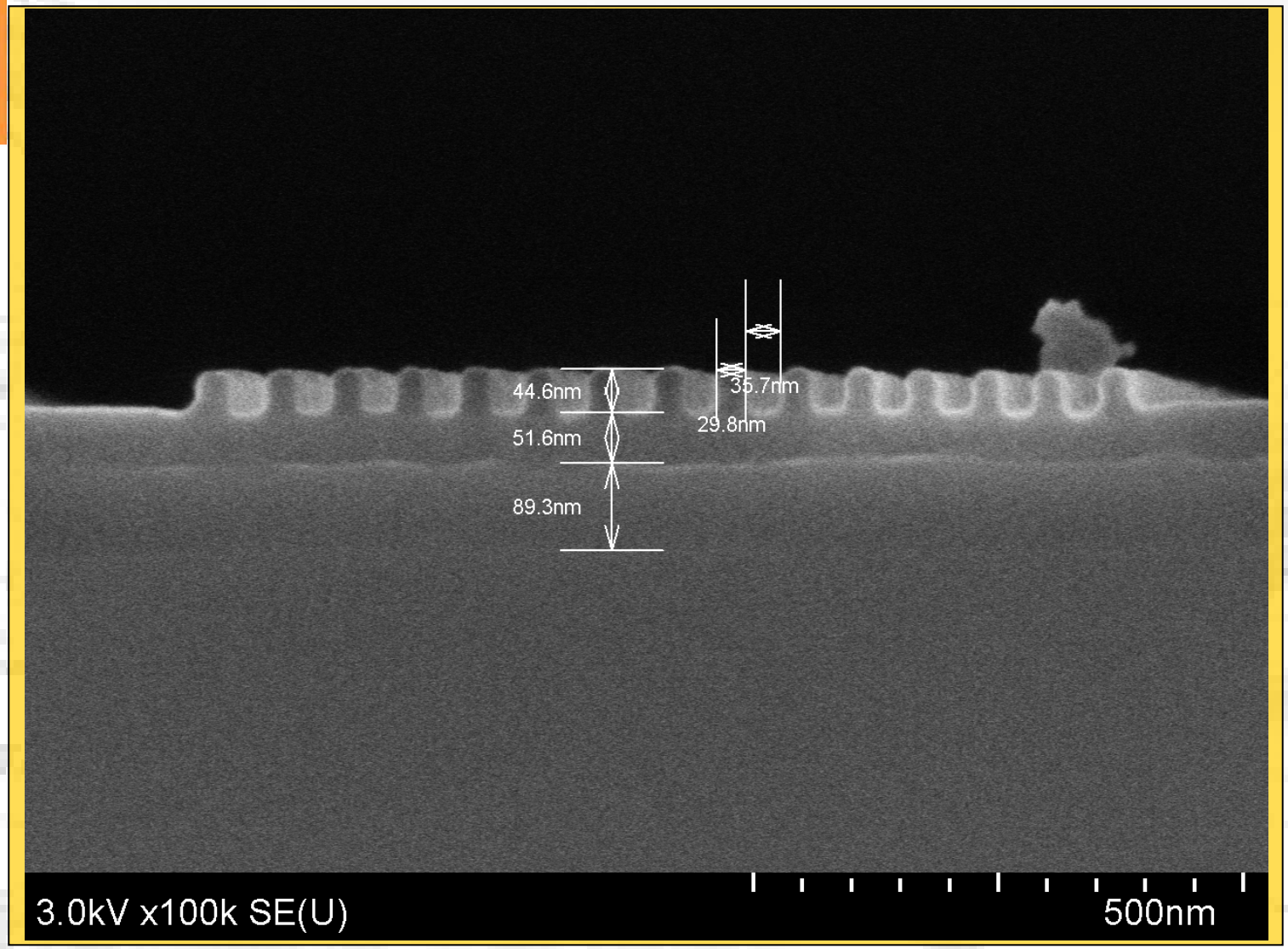
Submitted by: Jingyu Zhang, Deirdre Olynick and Stefano Cabrini

Affiliation: Nanofabrication group, the Molecular Foundry, Lawrence Berkeley National Laboratory

2011 EIPBN MicroGraph Contest

Micrograph Title:
EUV- Scrat has lost his n-Acorn ...again

Description:
32 nm half-pitch EUV photoresist resist lines



Magnification (3"x4" image): 100K X
Submitted by: Alessandro Vaglio Pret

Instrument (Make and Model): Hitachi X-SEM SU8000
Affiliation: IMEC/KUL

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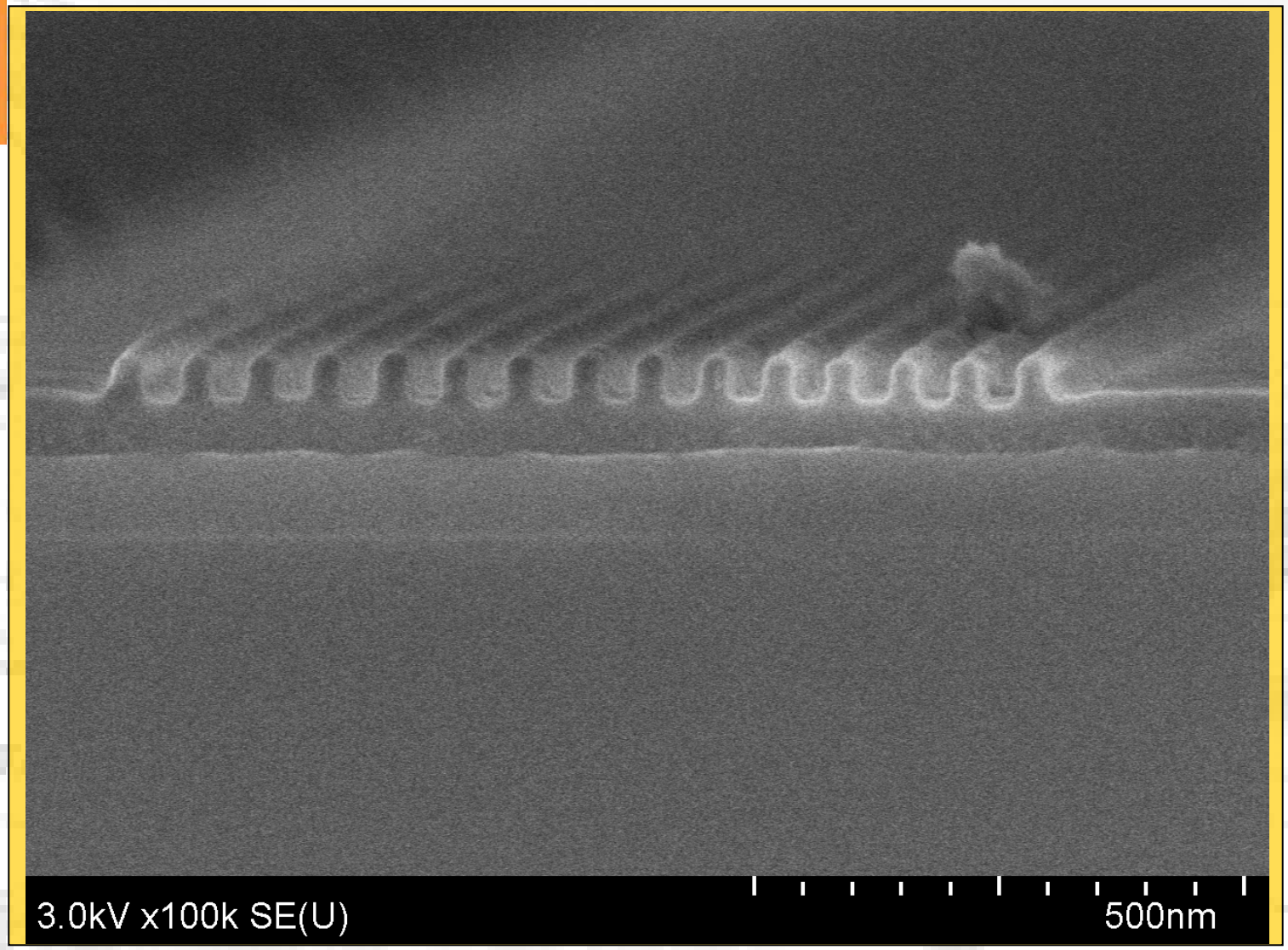
2011 EIPBN MicroGraph Contest

Micrograph Title:
EUV- Scrat has lost his n-Acorn ...again

Description:
32 nm half-pitch EUV photoresist resist lines



Magnification (3"x4" image): 100K X
Submitted by: Alessandro Vaglio Pret

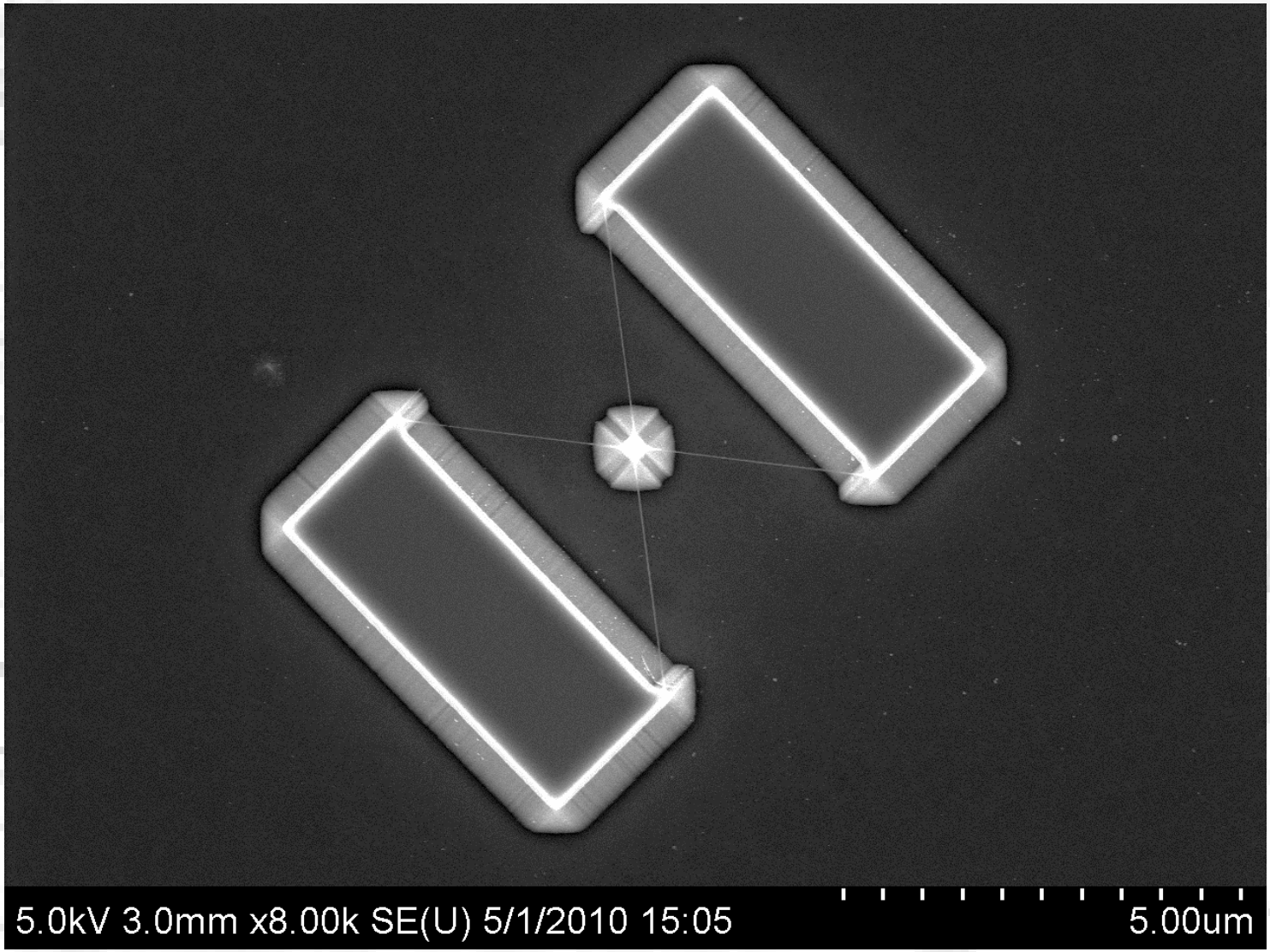
Instrument (Make and Model): Hitachi X-SEM SU8000
Affiliation: IMEC/KUL

*

2011 EIPBN MicroGraph Contest

Micrograph Title:
Space Drone

Description:
Incomplete KOH etch of an 'antenna resonator' – a quadruply clamped structure with a pad in the centre.



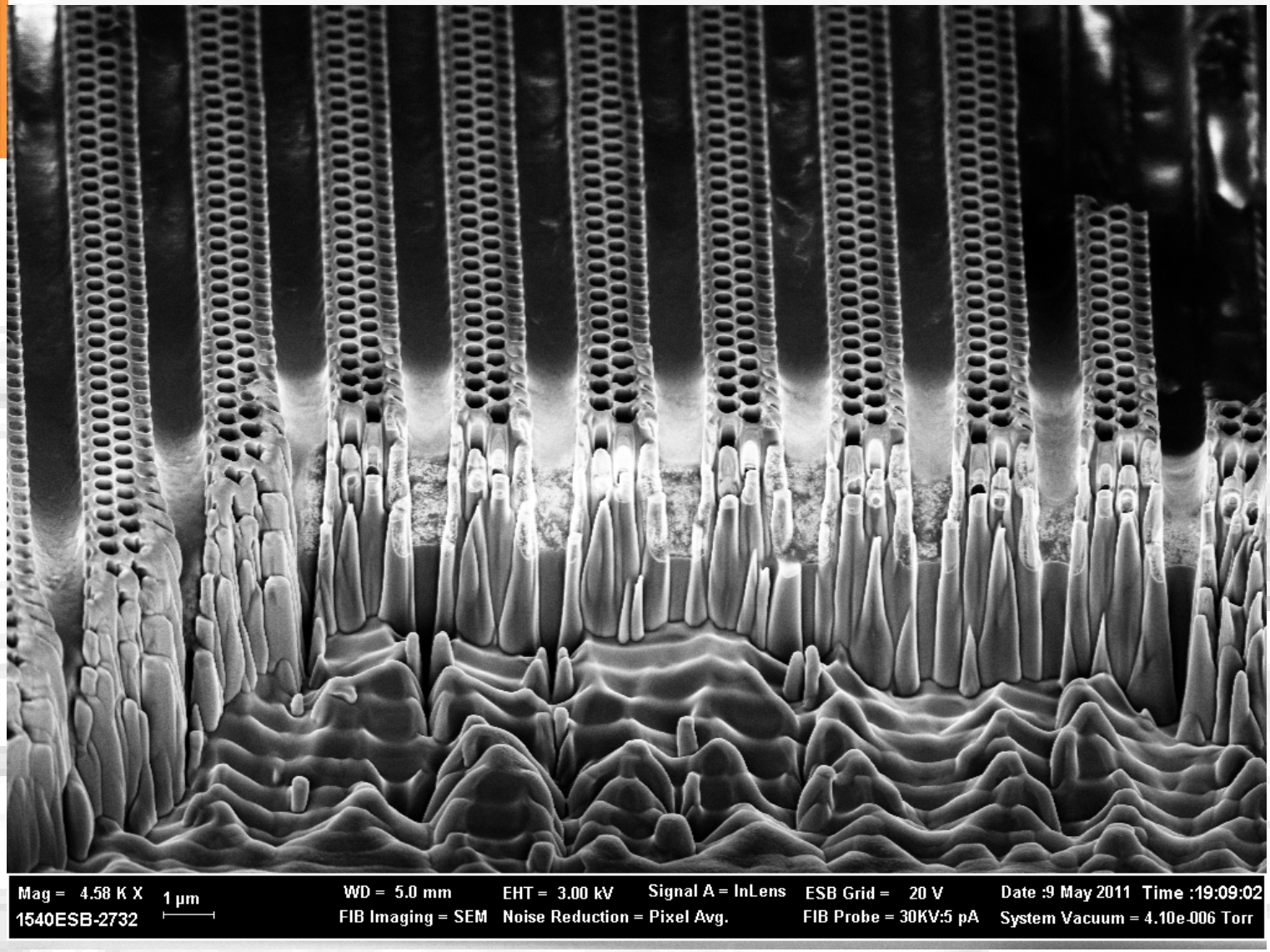
Magnification (3"x4" image): 8,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada

2011 EIPBN MicroGraph Contest

Micrograph Title:
A Micro Grand Canyon

Description:
Si photonic crystals milled by FIB



Magnification (3"x4" image): 4.58KX **Instrument (Make and Model): Zeiss XB1540 EsB**

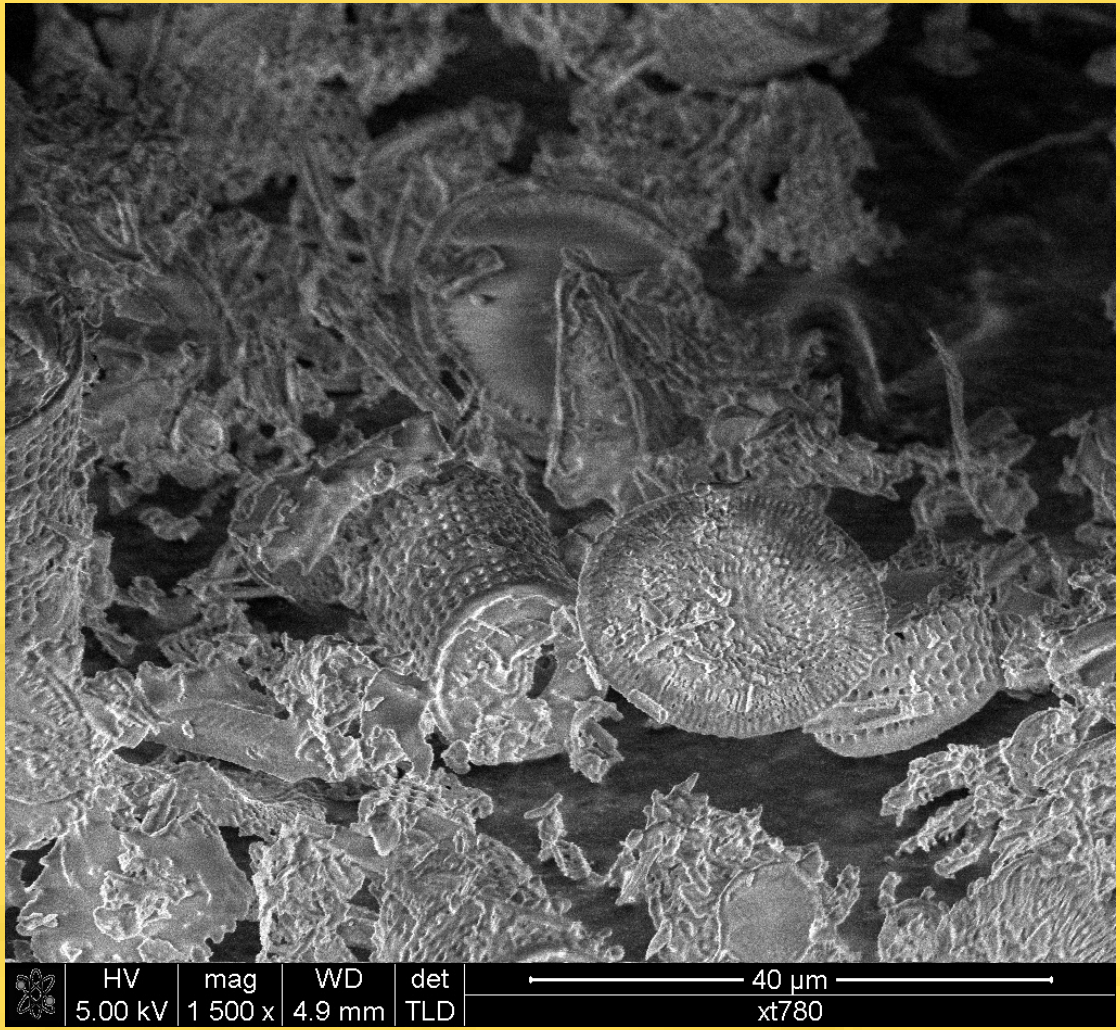
Submitted by: Jingyu Zhang, Deirdre Olynick and Stefano Cabrini

Affiliation: Nanofabrication group, the Molecular Foundry, Lawrence Berkeley National Laboratory

2011 EIPBN MicroGraph Contest

Micrograph Title:
A SAUCERFUL OF SECRETS (a)

Description:
Celite powder, consisting of fossilized remains of diatoms, a type of hard-shelled algae.

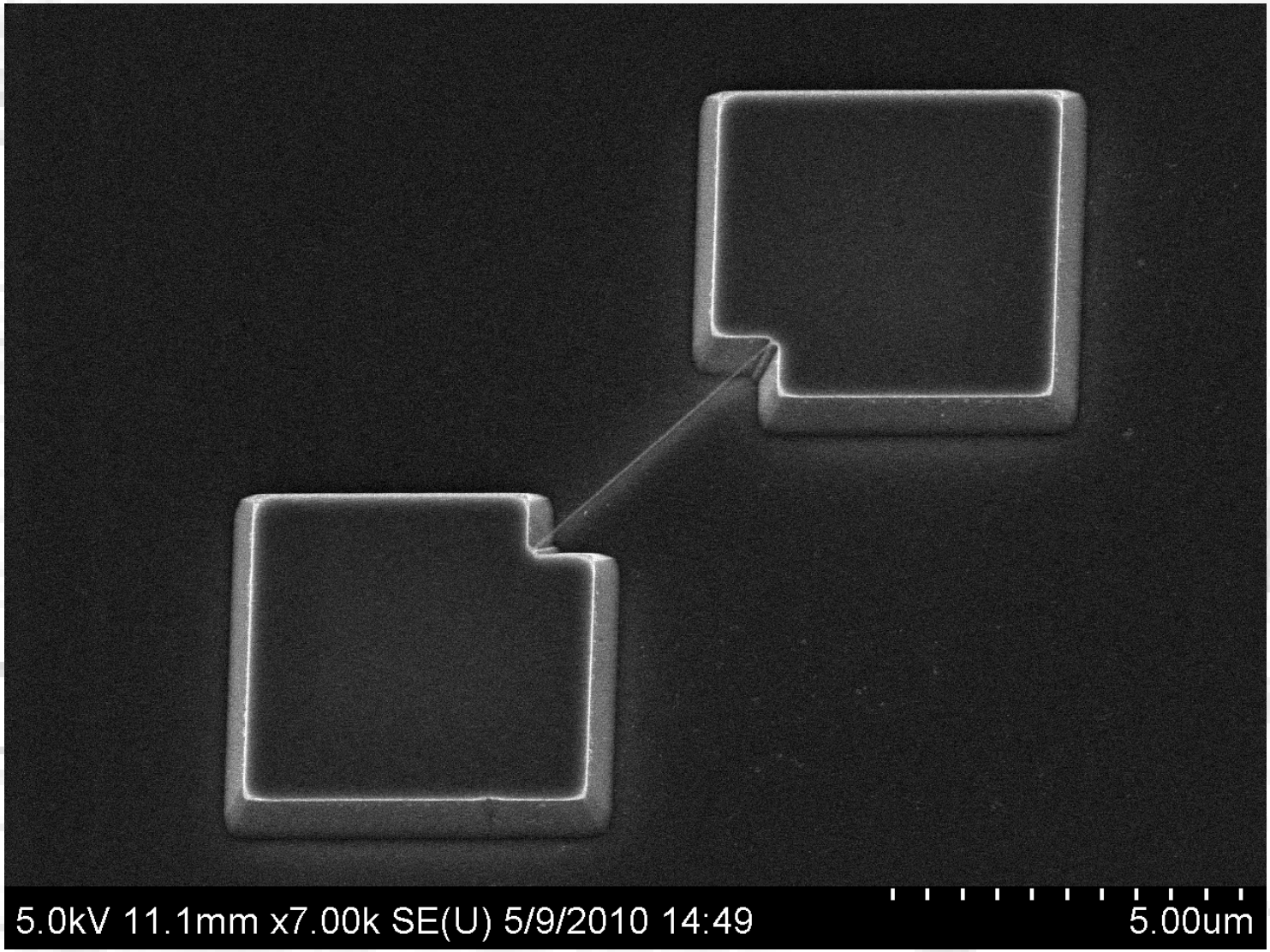


Magnification (3"x4" image): **1500x**
Instrument (Make and Model): **FEI COMPANY – NOVA 200**
Submitted by: **Clovis Fischer, Alfredo R. Vaz**
Affiliation: **CCS - UNICAMP**

2011 EIPBN MicroGraph Contest

Micrograph Title:
Tiny Bridge 1

Description:
5 um long, sub-20 nm Silicon Carbon Nitride Doubly Clamped Cantilever on Silicon



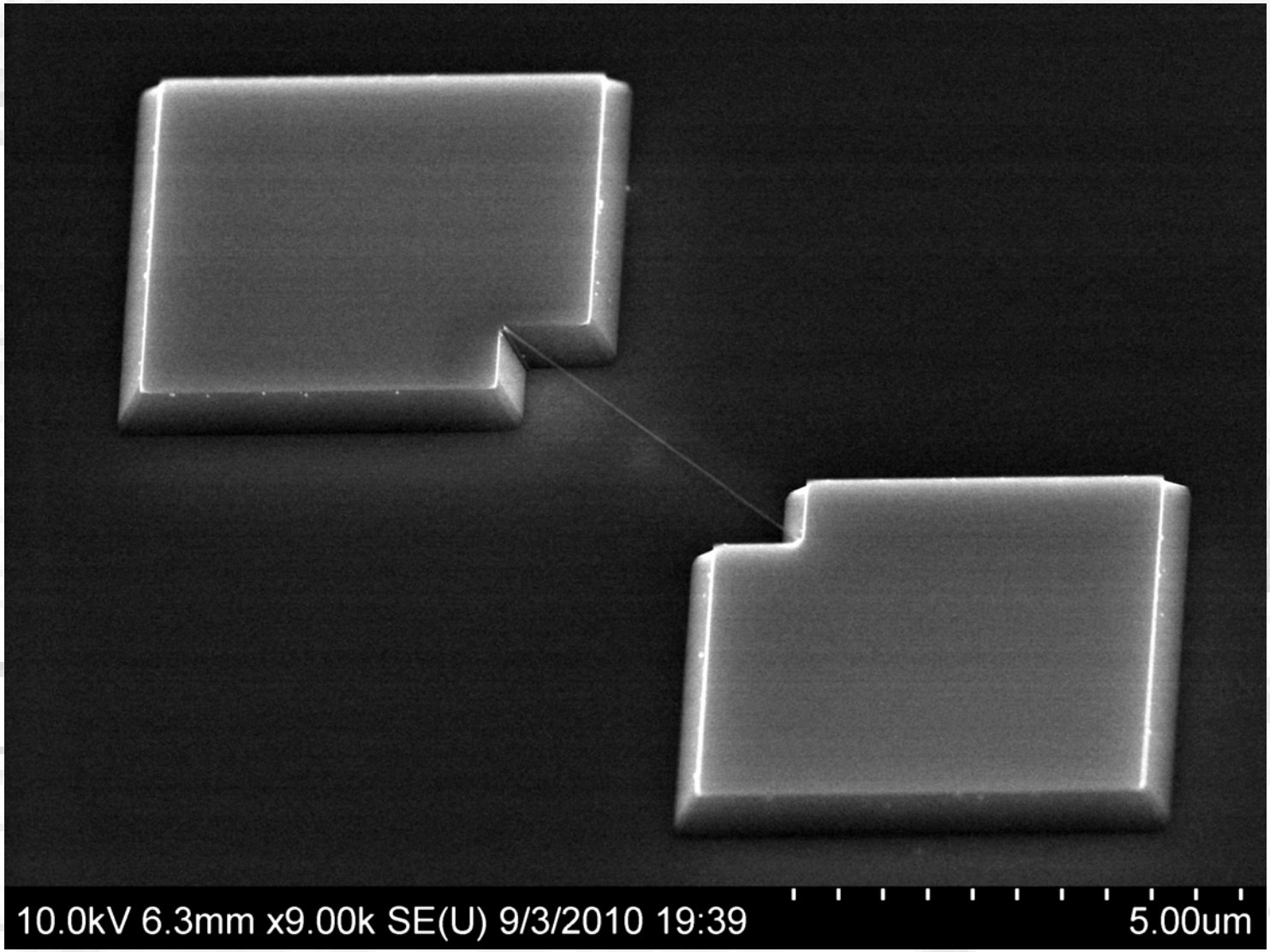
Magnification (3"x4" image): 7,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada *

2011 EIPBN MicroGraph Contest

Micrograph Title:
Tiny Bridge 2

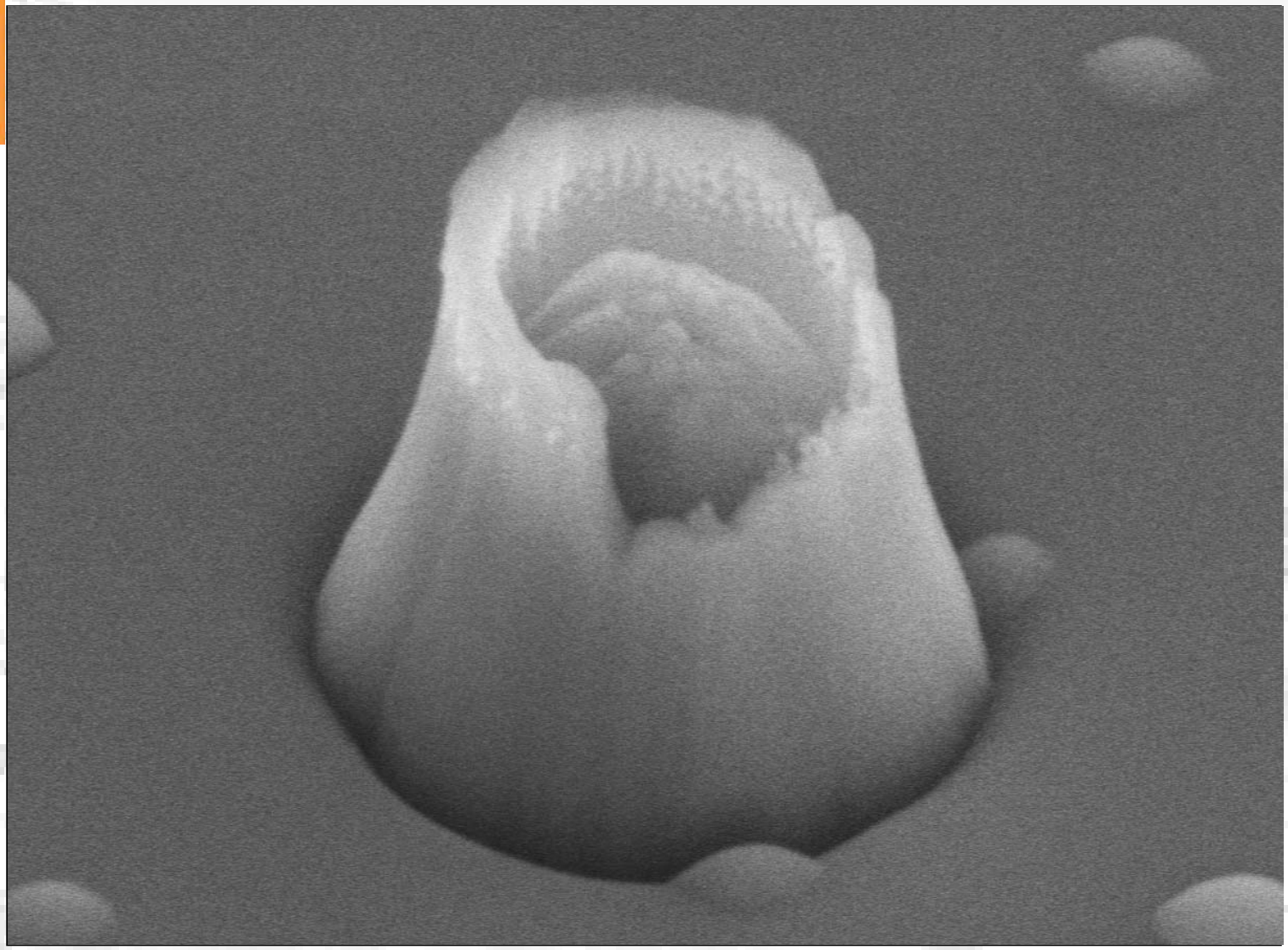
Description:
5 um long, sub-10 nm Silicon Carbon Nitride Doubly Clamped Cantilever on Silicon



Magnification (3"x4" image): 9,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada *

2011 EIPBN MicroGraph Contest



Micrograph Title: Schicksalsberg

Description: Nanoscale "Schicksalsberg" from the Lord of the Rings

Magnification (3"x4" image): 80k

Submitted by: Manuel Hofer

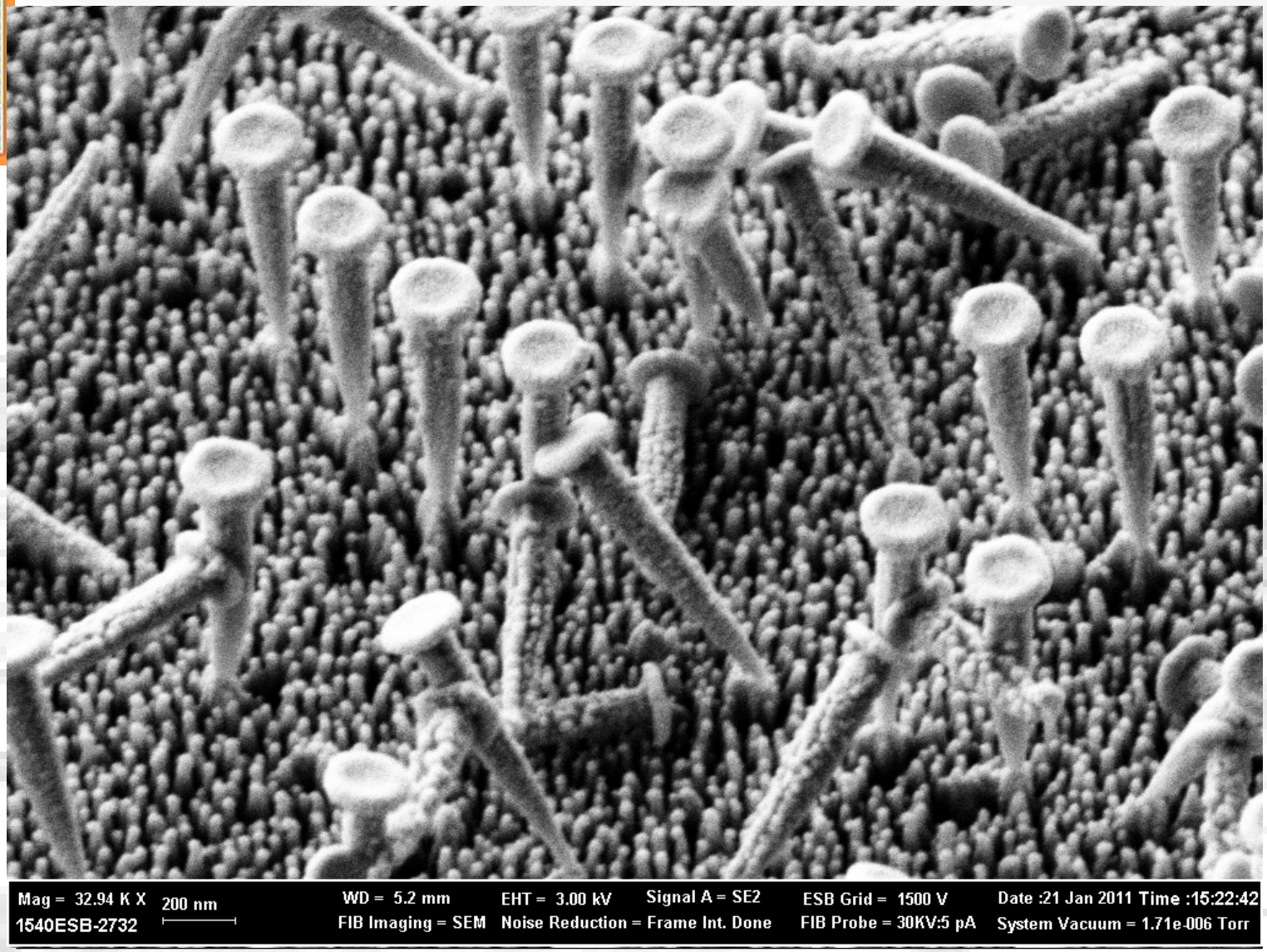
Instrument (Make and Model): Hitachi S4800

Affiliation:TU Ilmenau Micro- and Nanoelectronic Systems

2011 EIPBN MicroGraph Contest

Micrograph Title:
Nano Needles

Description:
The photonic crystal structure is fabricated on Er^{3+} doped SiNx with Cr mask . It's over etched and the pillars are undercut and falling down.



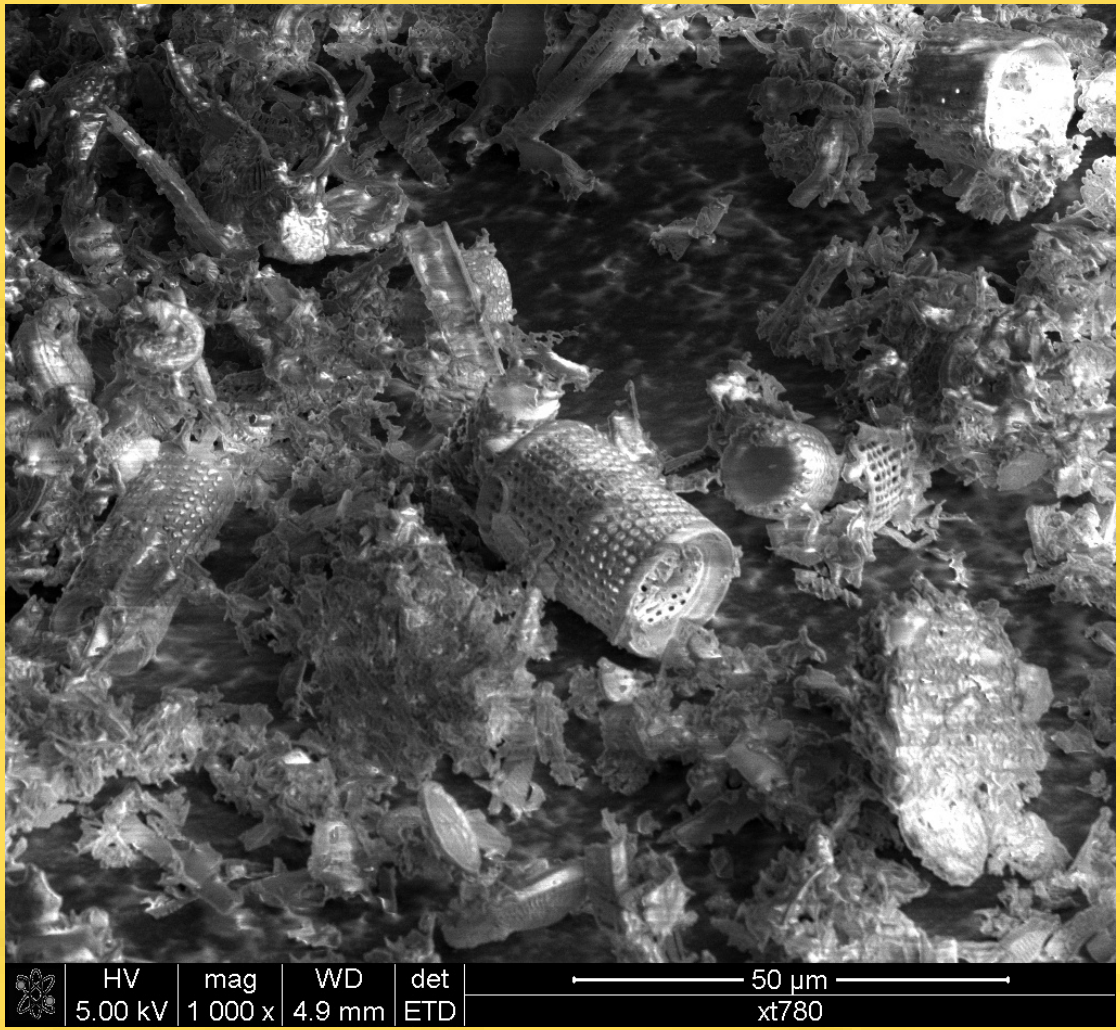
Magnification (3"x4" image): 32.94 KX **Instrument (Make and Model): Zeiss XB1540 EsB**

Submitted by: Jingyu Zhang, Nate Lawrence, Deirdre Olynick, Stefano Cabrini and Luca Dal Negro
Affiliation: the Molecular Foundry, Lawrence Berkeley National Laboratory and Electrical Engineering Department, Boston University

2011 EIPBN MicroGraph Contest

Micrograph Title:
A SAUCERFUL OF SECRETS (b)

Description:
Celite powder, consisting of fossilized remains of diatoms, a type of hard-shelled algae.

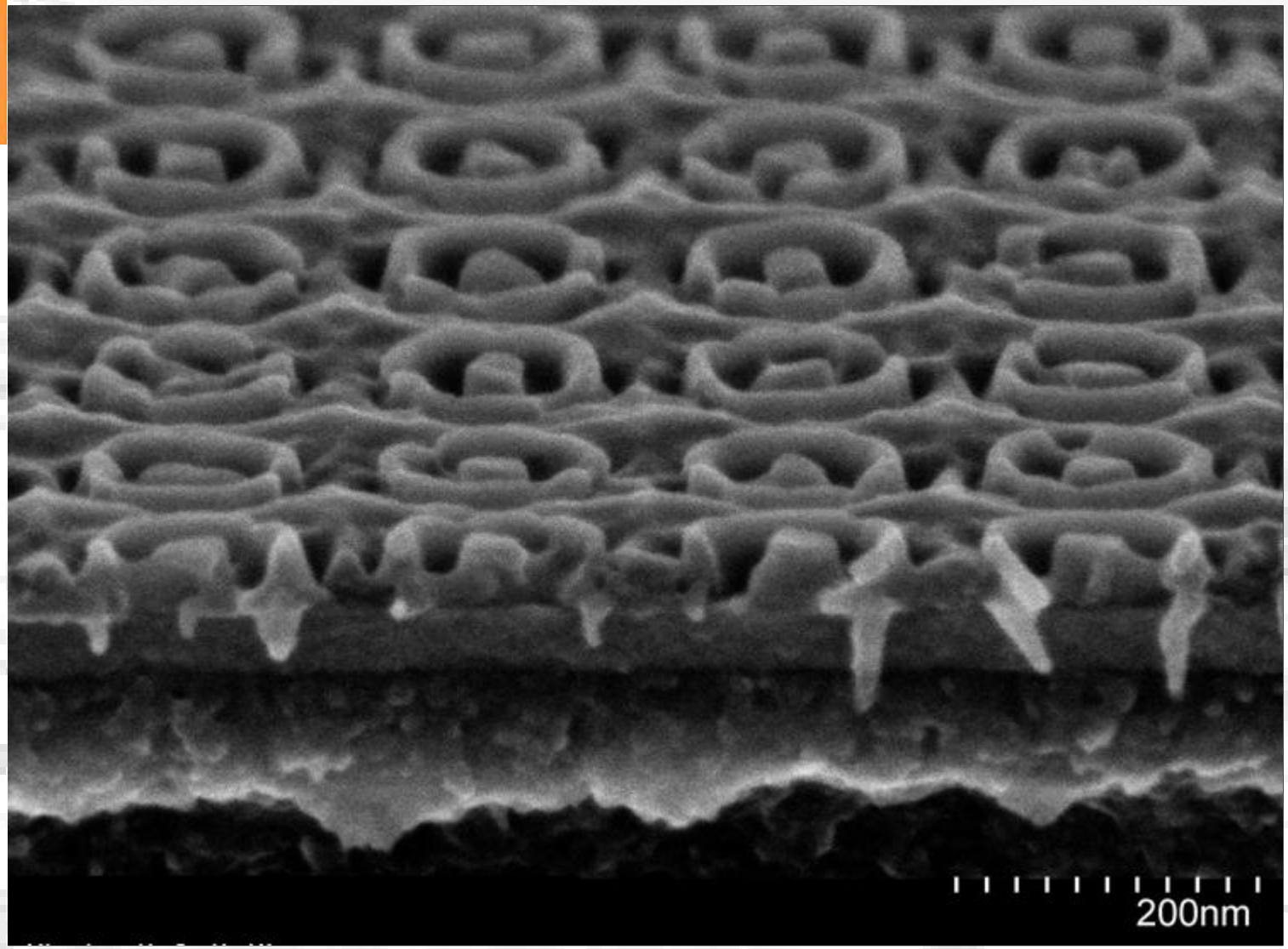


Magnification (3"x4" image): **1000x**
Instrument (Make and Model): **FEI COMPANY – NOVA 200**
Submitted by: **Clovis Fischer, Alfredo R. Vaz**
Affiliation: **CCS - UNICAMP**

2011 EIPBN MicroGraph Contest

Micrograph Title:
Arms of Octopus

Description:
Directed Self-Assembled (DSA) PS patterns in optical lithography hole pre-patterns.



Magnification (3"x4" image): X150,000
Submitted by: Y. Seino and T. Azuma

Instrument (Make and Model): SEM Hitachi S5500
Affiliation: Toshiba Corp., Japan

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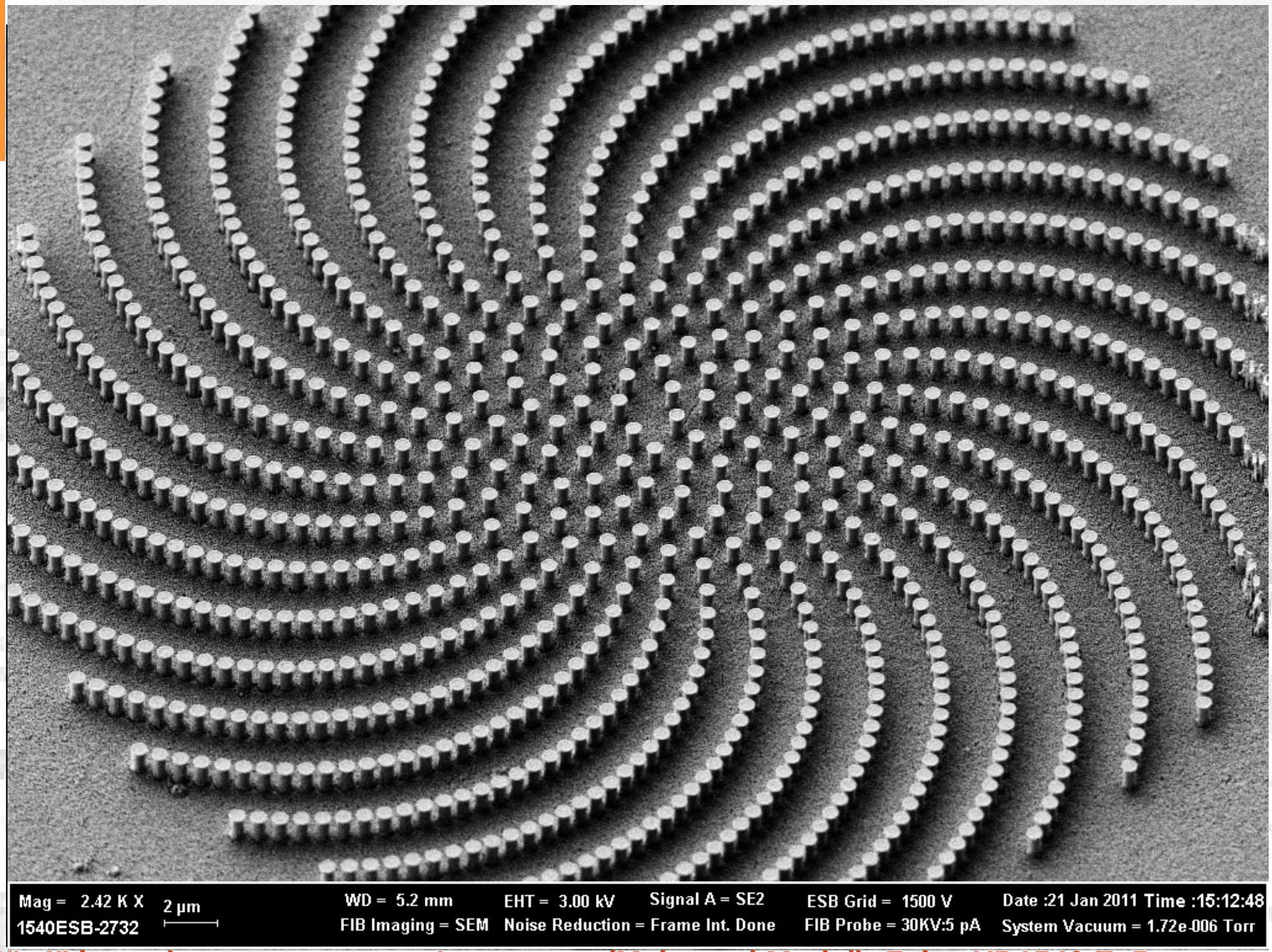
2011 EIPBN MicroGraph Contest

Micrograph Title:
Photonic Crystals Tornado

Description:
This is an aperiodic photonic structure fabricated on Er^{3+} doped SiNx



Magnification (3"x4" image): **Instrument (Make and Model): Zeiss XB1540 EsB**

Submitted by: Jingyu Zhang, Nate Lawrence, Deirdre Olynick, Stefano Cabrini and Luca Dal Negro
Affiliation: the Molecular Foundry, Lawrence Berkeley National Laboratory and Electrical Engineering Department, Boston University

2011 EIPBN MicroGraph Contest

Micrograph Title: Feynman's vision in reverse

Description: Why cannot we reverse the lenses of an electron beam lithography system? A 1.0mm tapered structure written and imaged at high resolution by the same electron beam lithography system.

Magnification (3"x4" image): 100x

Instrument (Make and Model): Raith *e_LiNE plus*

Submitted by: Jason E. Sanabia and Matthias Berse

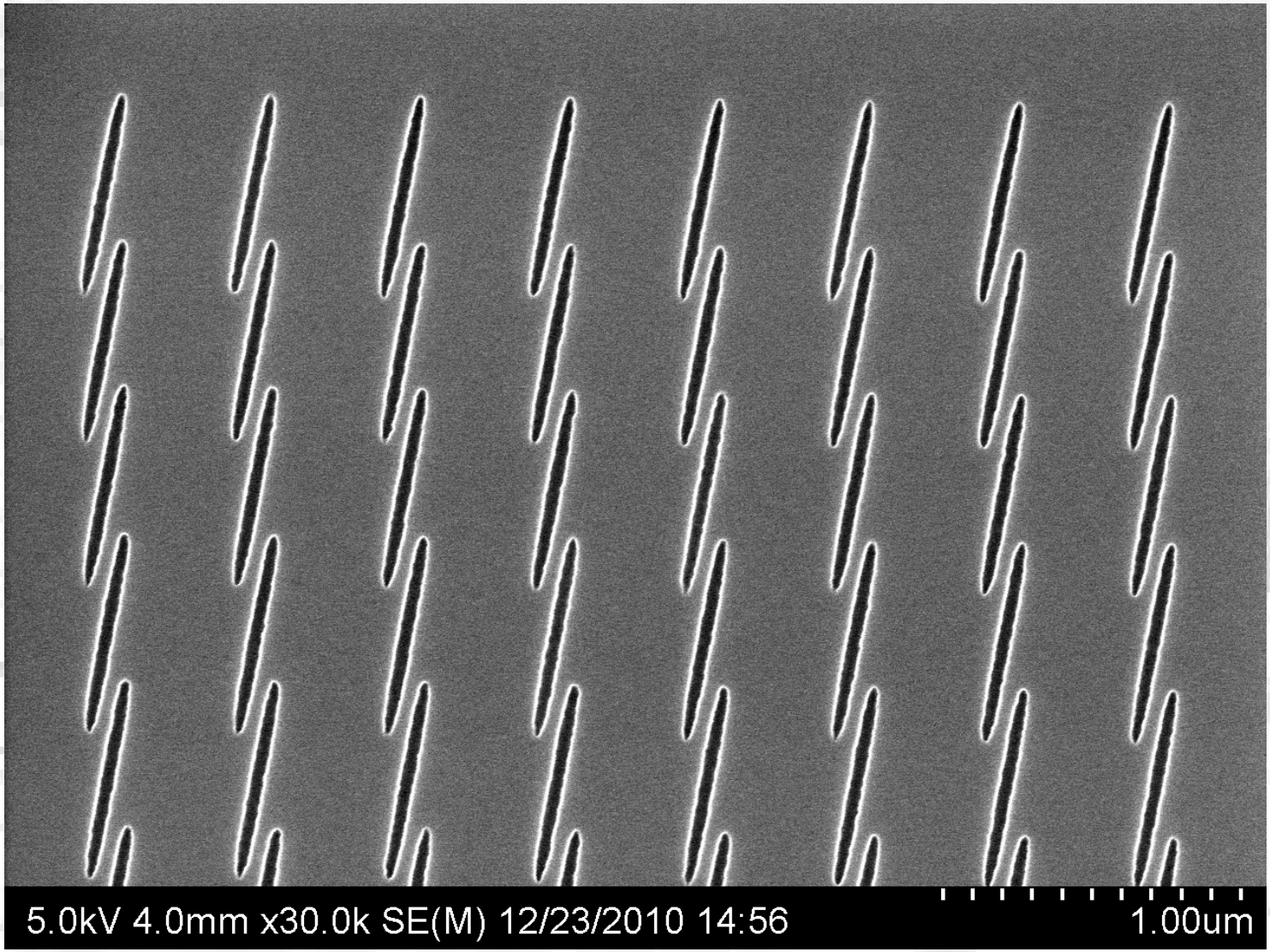
Affiliation: Raith

*

2011 EIPBN MicroGraph Contest

Micrograph Title:
Drizzle

Description:
EBL patterning of holes with a very high beam speed i.e., in-excess of the advised limit ☺



Magnification (3"x4" image): 30,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada

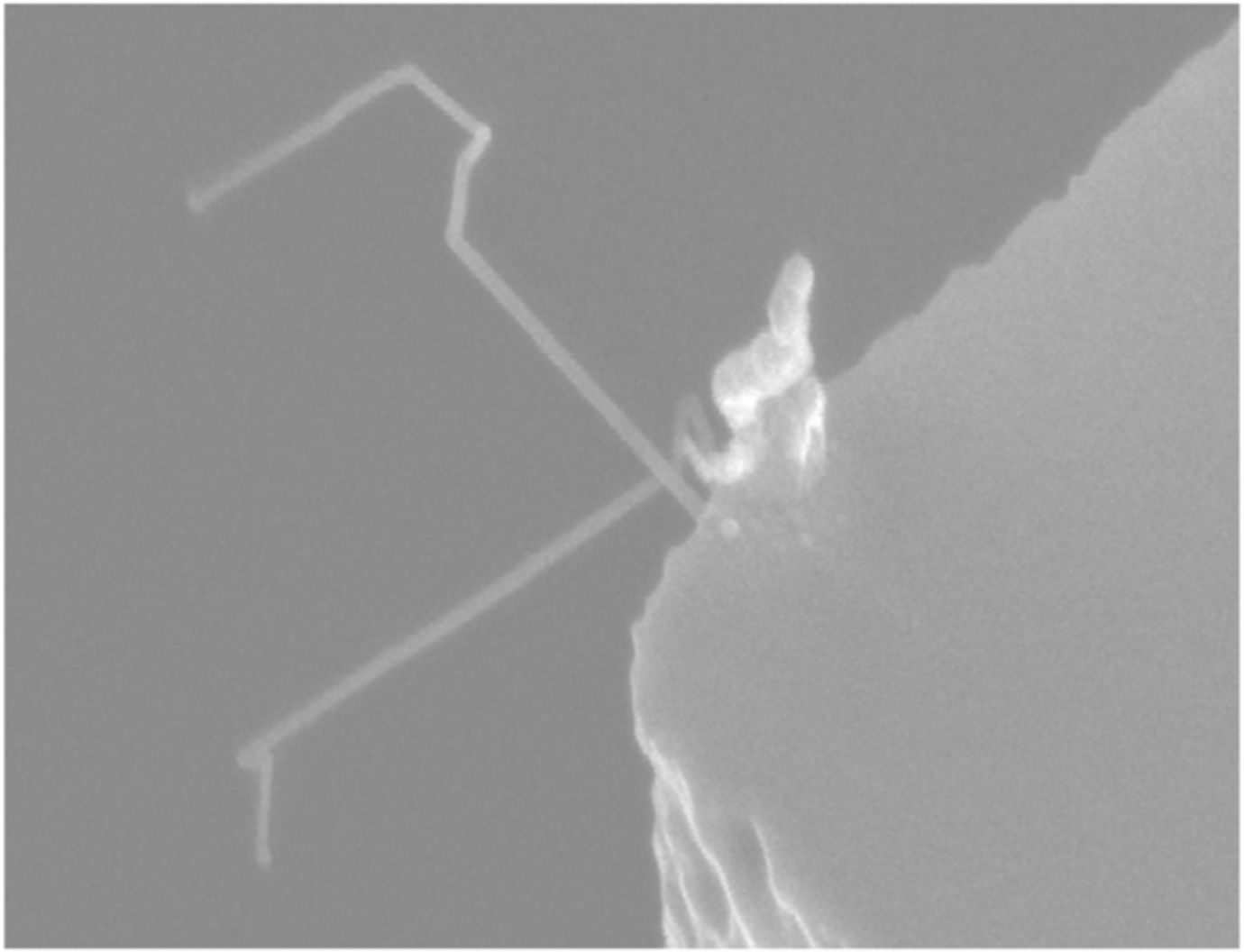
2011 EIPBN MicroGraph Contest

Micrograph Title:
NOAH'S ARK, AFTER THE GREAT FLOOD

Description:
Celite powder, consisting of fossilized remains of diatoms, a type of hard-shelled algae.

Magnification (3"x4" image): **1500x**
Instrument (Make and Model): **FEI COMPANY – NOVA 200**
Submitted by: **Clovis Fischer, Alfredo R. Vaz**
Affiliation: **CCS - UNICAMP**

2011 EIPBN MicroGraph Contest



Micrograph Title:
Fishing Bunny

Description:
CNTs grown from catalysts deposited on top of released cantilevers through a nano-stencil

Magnification (3"x4" image): x 50k
Submitted by: Veronica Savu

Instrument (Make and Model): Zeiss LEO 1550
Affiliation: EPFL

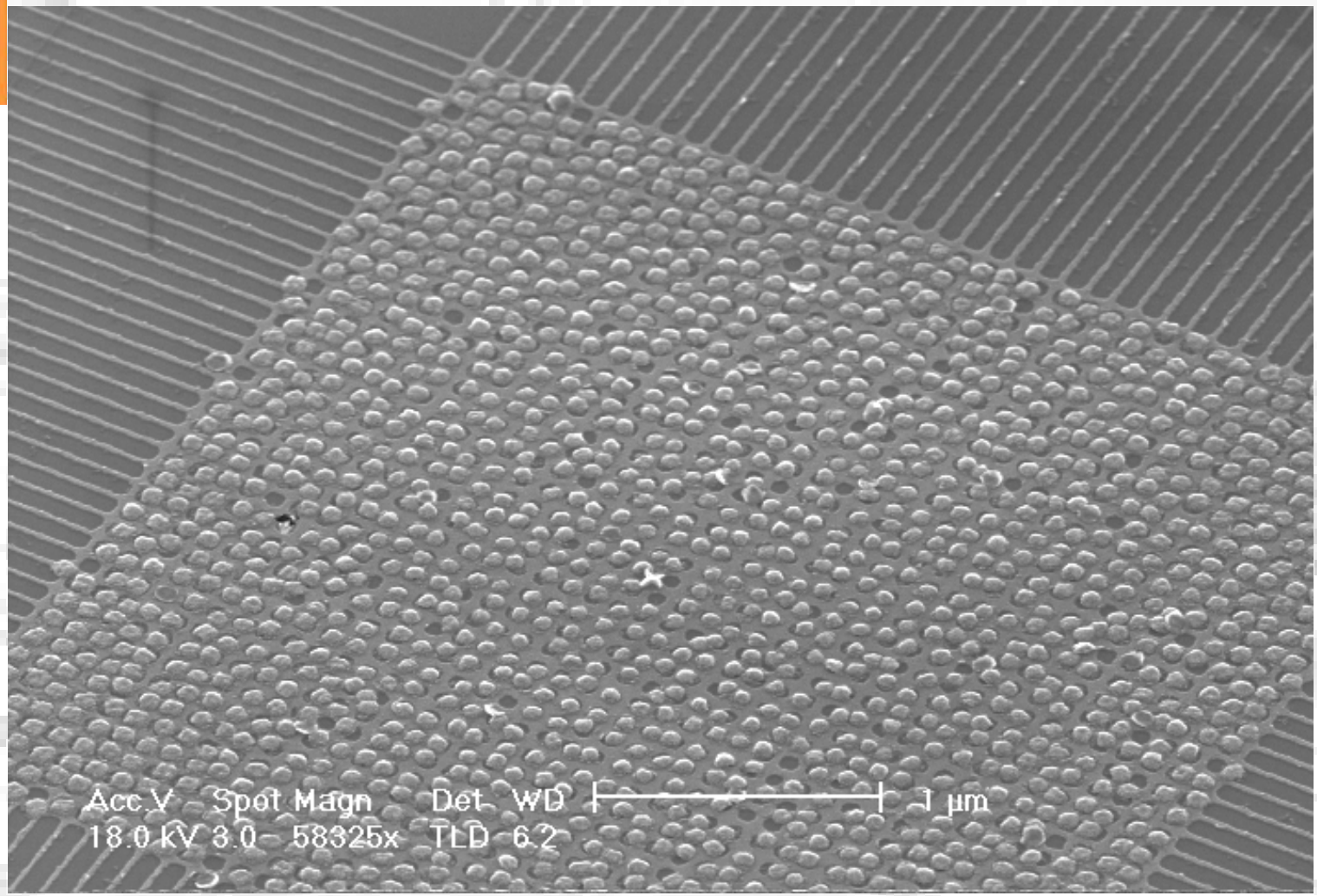
2011 EIPBN MicroGraph Contest

Micrograph Title:

Where's Waldo?

Description:

Incomplete metal lift-off of Ti-AuPd pattern in PMMA on silicon



Magnification (3"x4" image): 25400x
Submitted by: Fay Hudson

Instrument (Make and Model): Raith 150TWO
Affiliation: Australian National Fabrication Facility

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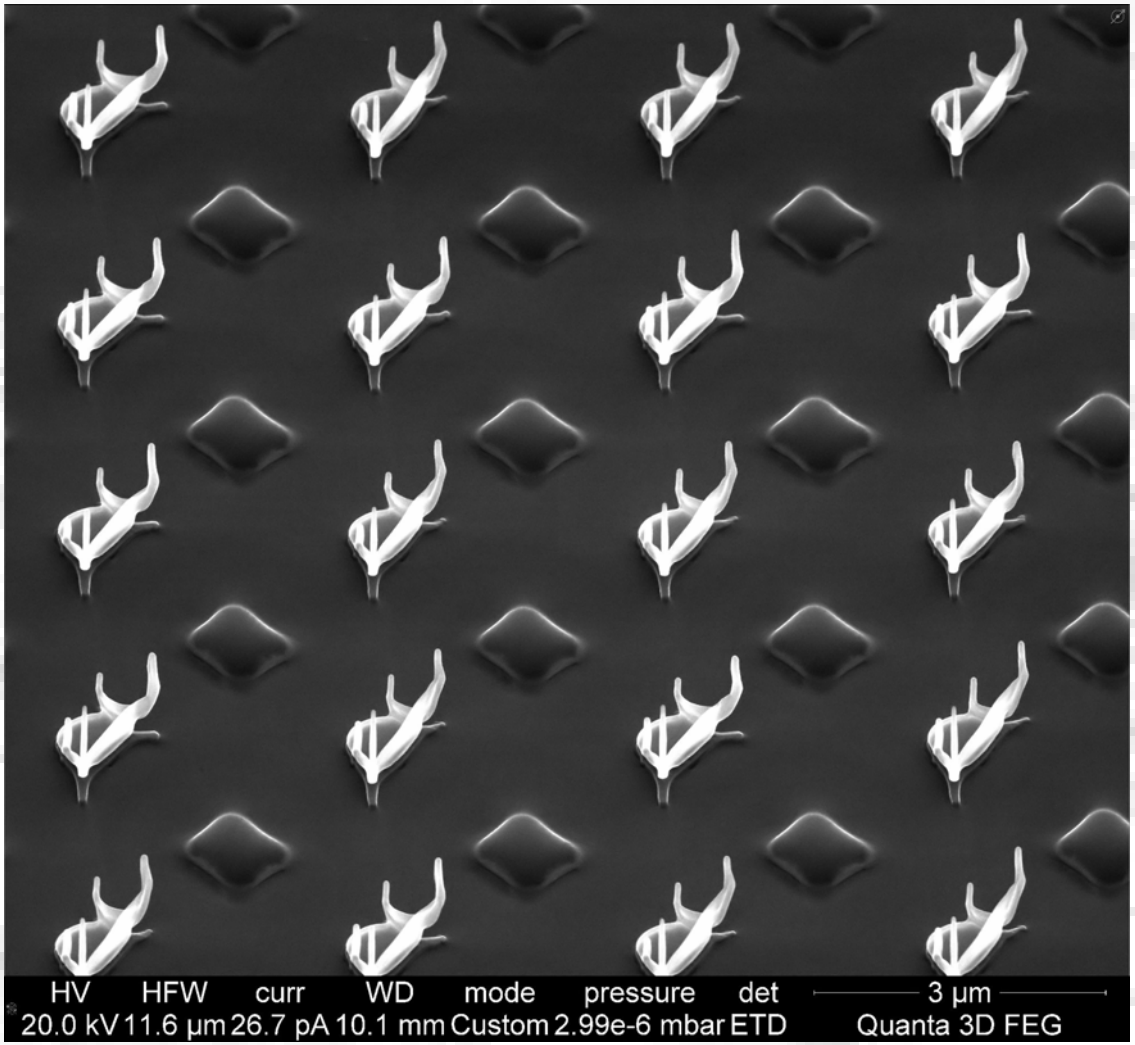
2011 EIPBN MicroGraph Contest

Micrograph Title:
Synchronized swimming

Description:
After we found the holly and the ivy we continued milling the Si3N4 layer and we discovered something beautiful



Magnification (3"x4" image): 12888X
Submitted by: V.G. Kutchoukov, P. Kruit

Instrument (Make and Model): FEI Quanta 3D FEG
Affiliation: TUDelft, The Netherlands

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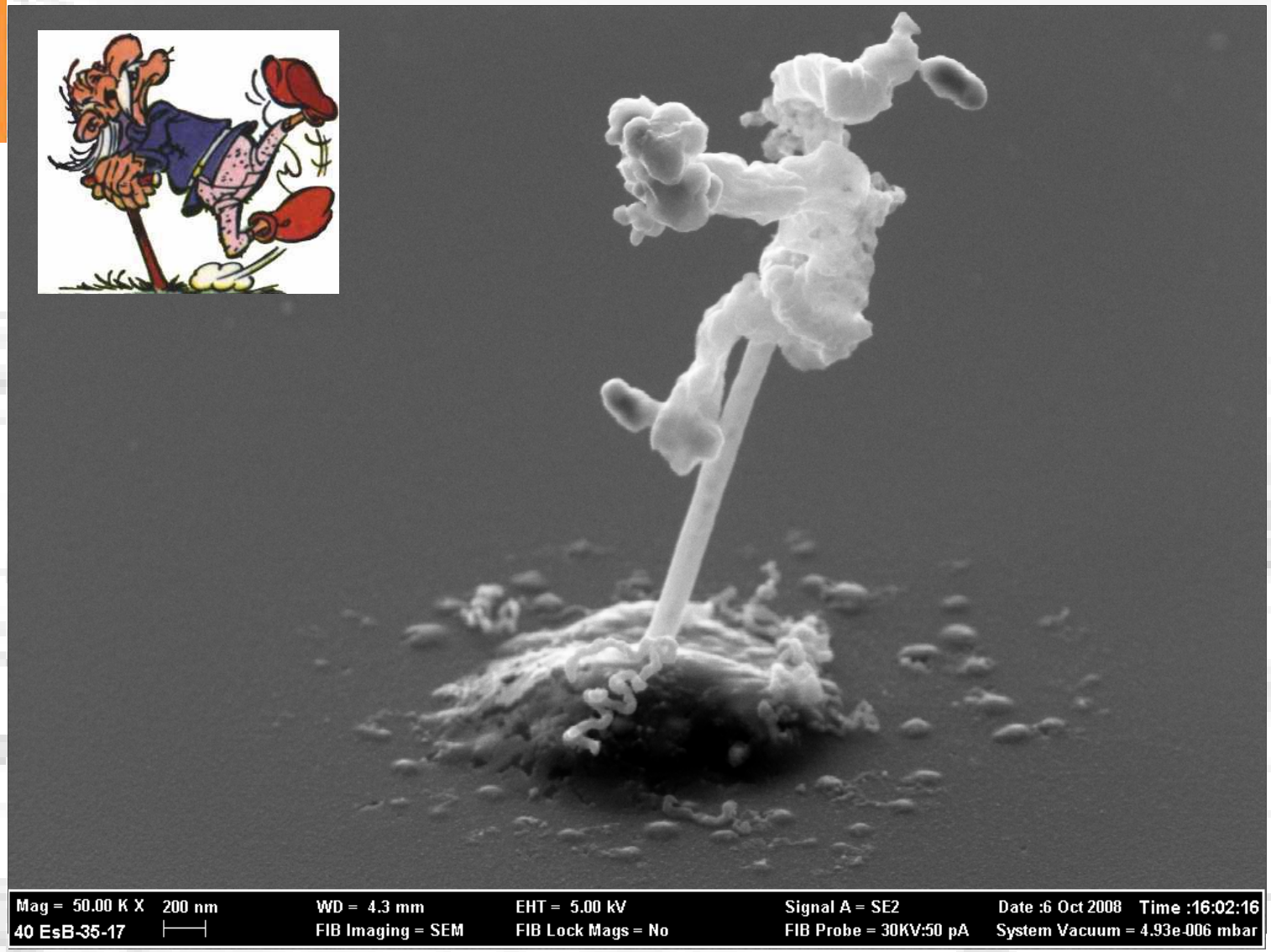
2011 EIPBN MicroGraph Contest

Micrograph Title: nano-Methusalix in his pajamas jumping on a stick

Description: Carbon nano-fibers on FEBID iron catalyst particle



Magnification (3"x4" image): 50 000

Instrument (Make and Model): FEBID, SEM

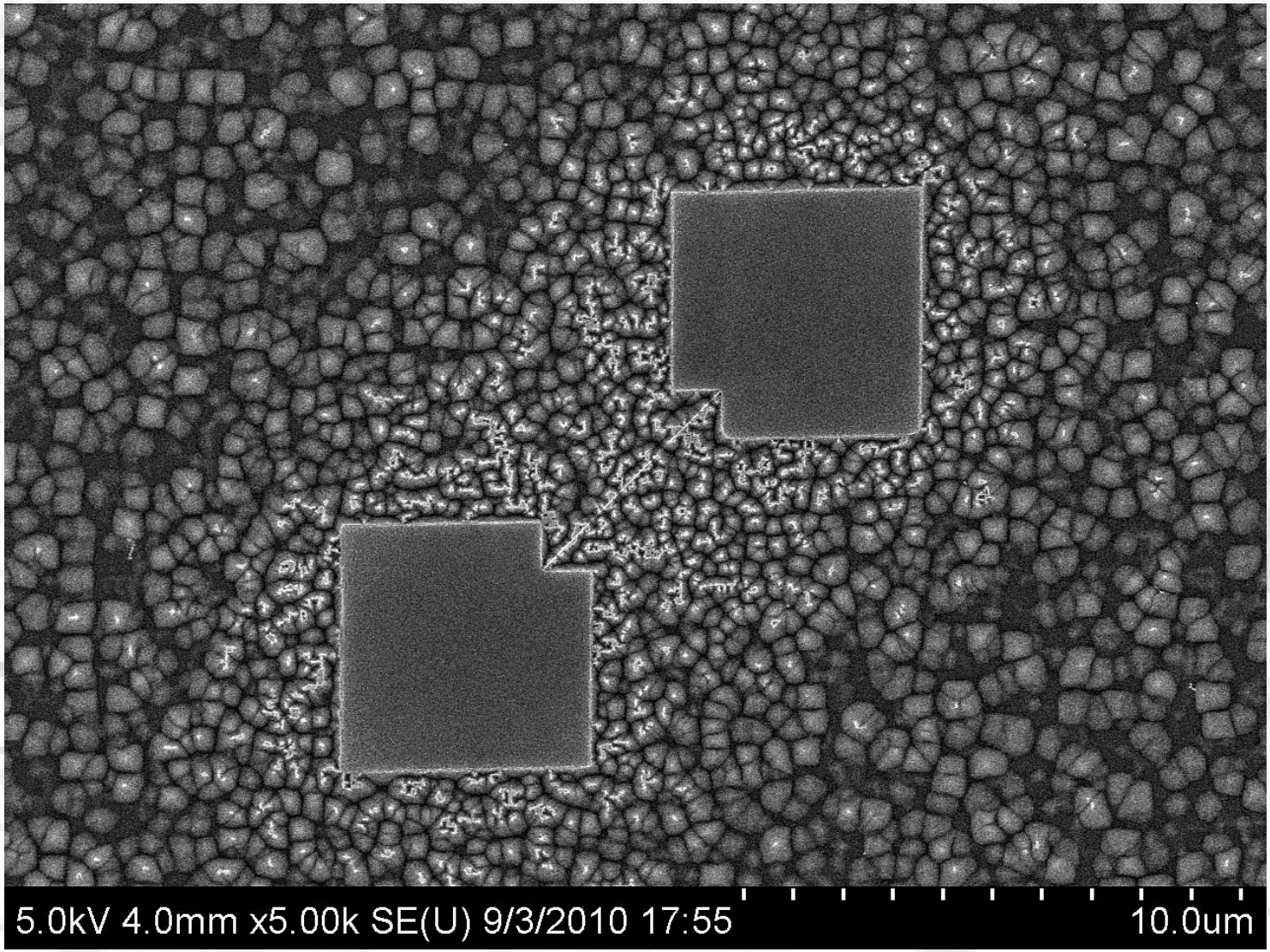
Submitted by: H.D.Wanzenboeck, G.Hochleitner

Affiliation: University of Technology Vienna, Austria

2011 EIPBN MicroGraph Contest

Micrograph Title:
Sandblasted Cantilever

Description:
A SiCN resonator with a horribly wrong release etch – the silicon seems micro-masked by something which does not allow a good KOH etch.



Magnification (3"x4" image): 5,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada

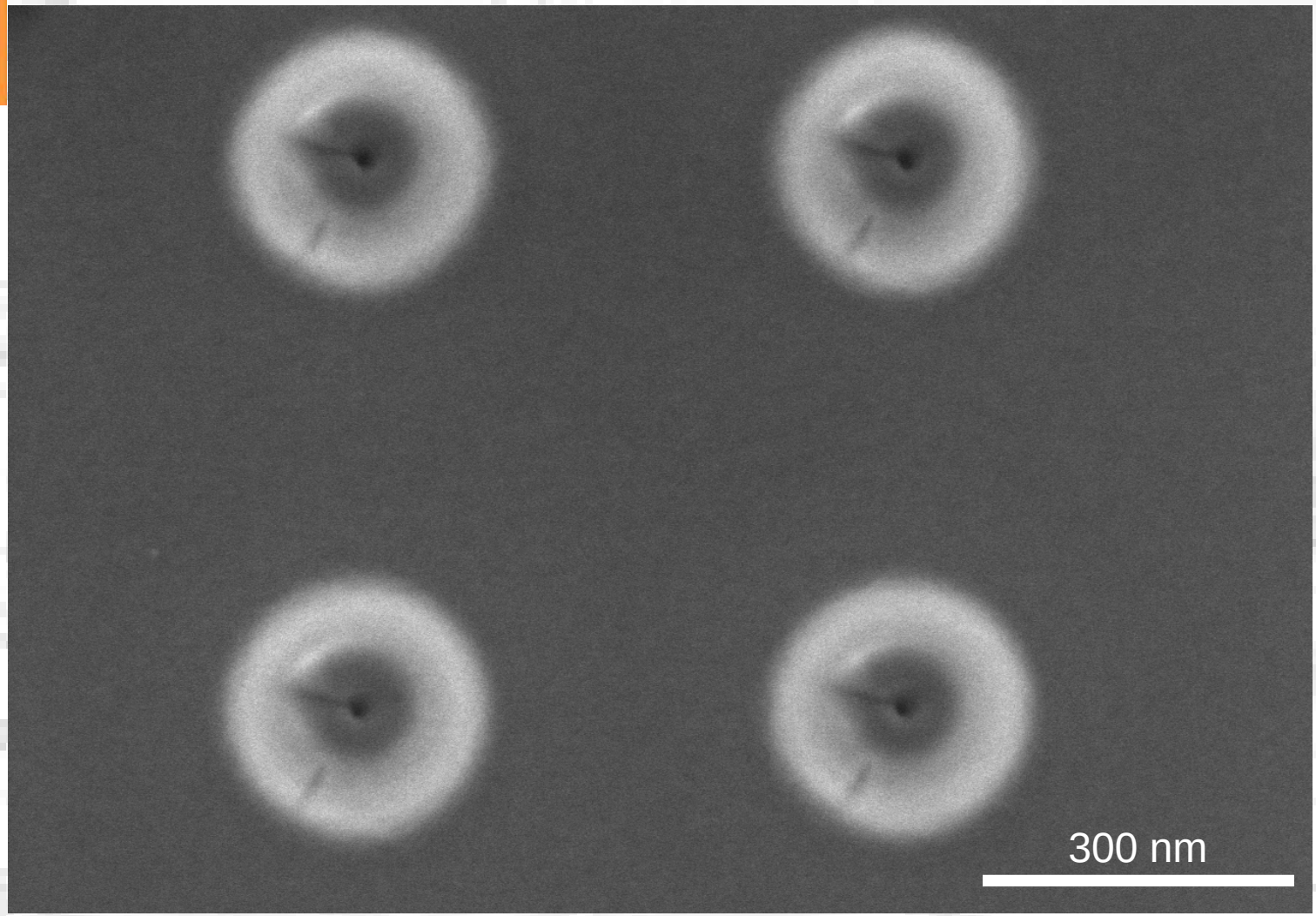
2011 EIPBN MicroGraph Contest

Micrograph Title:

The walls have eyes, and they read half past nine

Description:

Four ten-second point exposures of a focused beam of 30 keV helium ions on bulk <100> Si



Magnification (3"x4" image): 80,000x
Submitted by: Donny Winston

Instrument (Make and Model): Hitachi S-5500 FE-SEM
Affiliation: Massachusetts Institute of Technology

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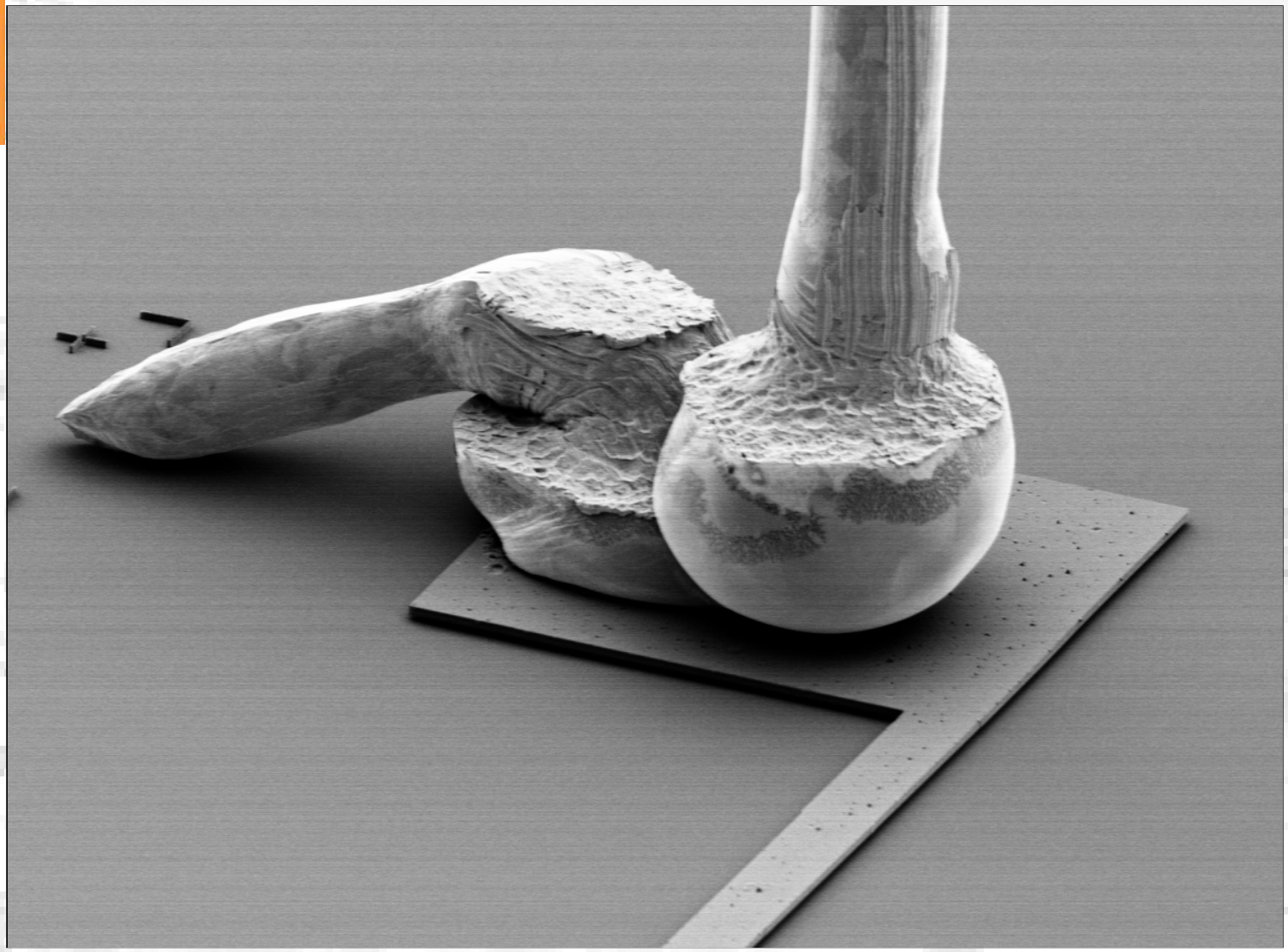
2011 EIPBN MicroGraph Contest



Micrograph Title:
Bondcrash

Description:
Gold wires crashed on 100µm² aluminum pad

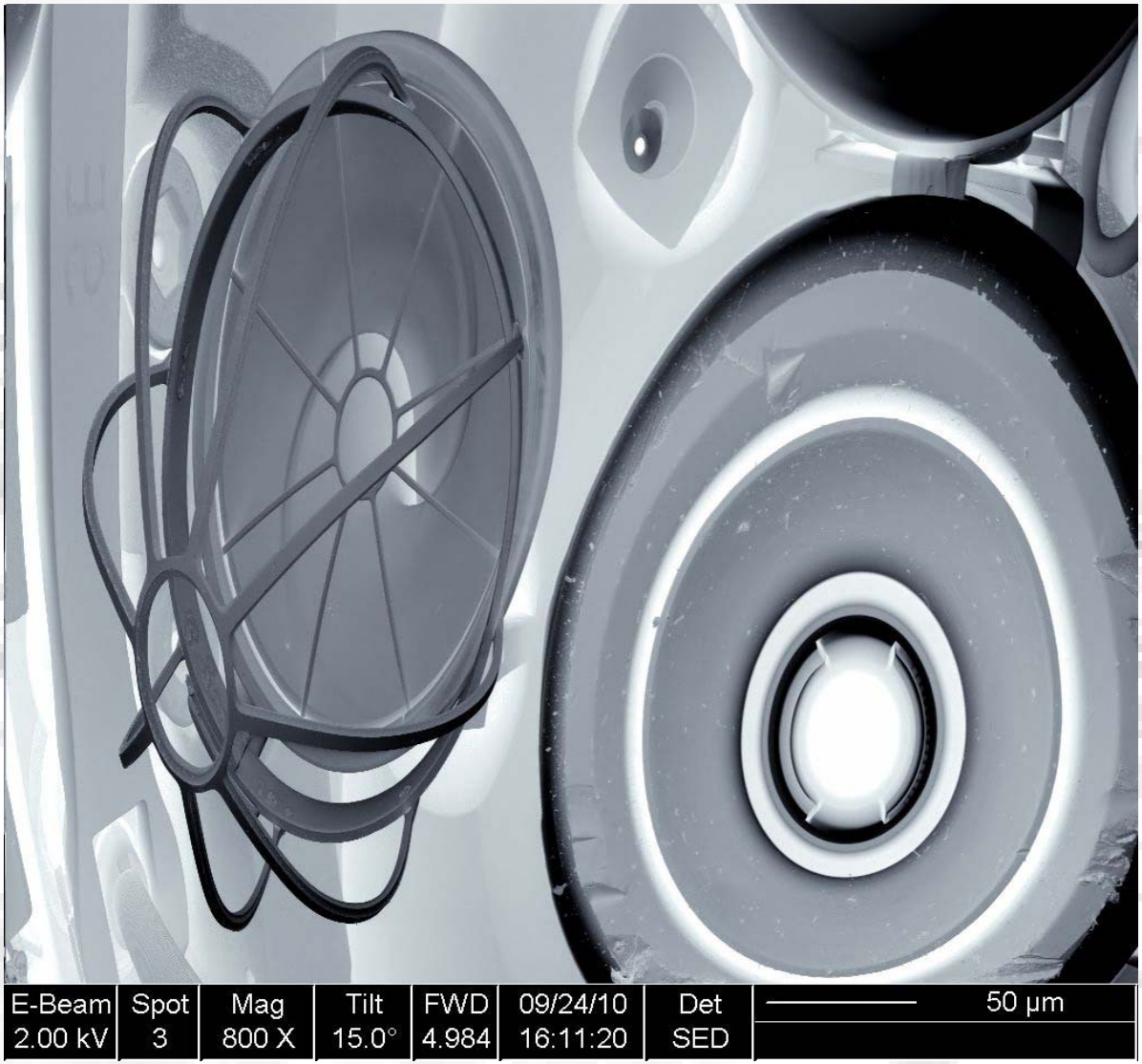
Magnification (3"x4" image): 450
Submitted by: Manuel Hofer

Instrument (Make and Model): Hitachi S4800
Affiliation:TU Ilmenau Micro- and Nanoelectronic Systems

2011 EIPBN MicroGraph Contest

Micrograph Title: Electron trip to the dentist

Description: Glass substrate acting as an electron mirror



Magnification (3"x4" image): 800X
Submitted by: V.G. Kutchoukov, P. Kruit

Instrument (Make and Model): FEI Strata DB235
Affiliation: TUDelft, The Netherlands

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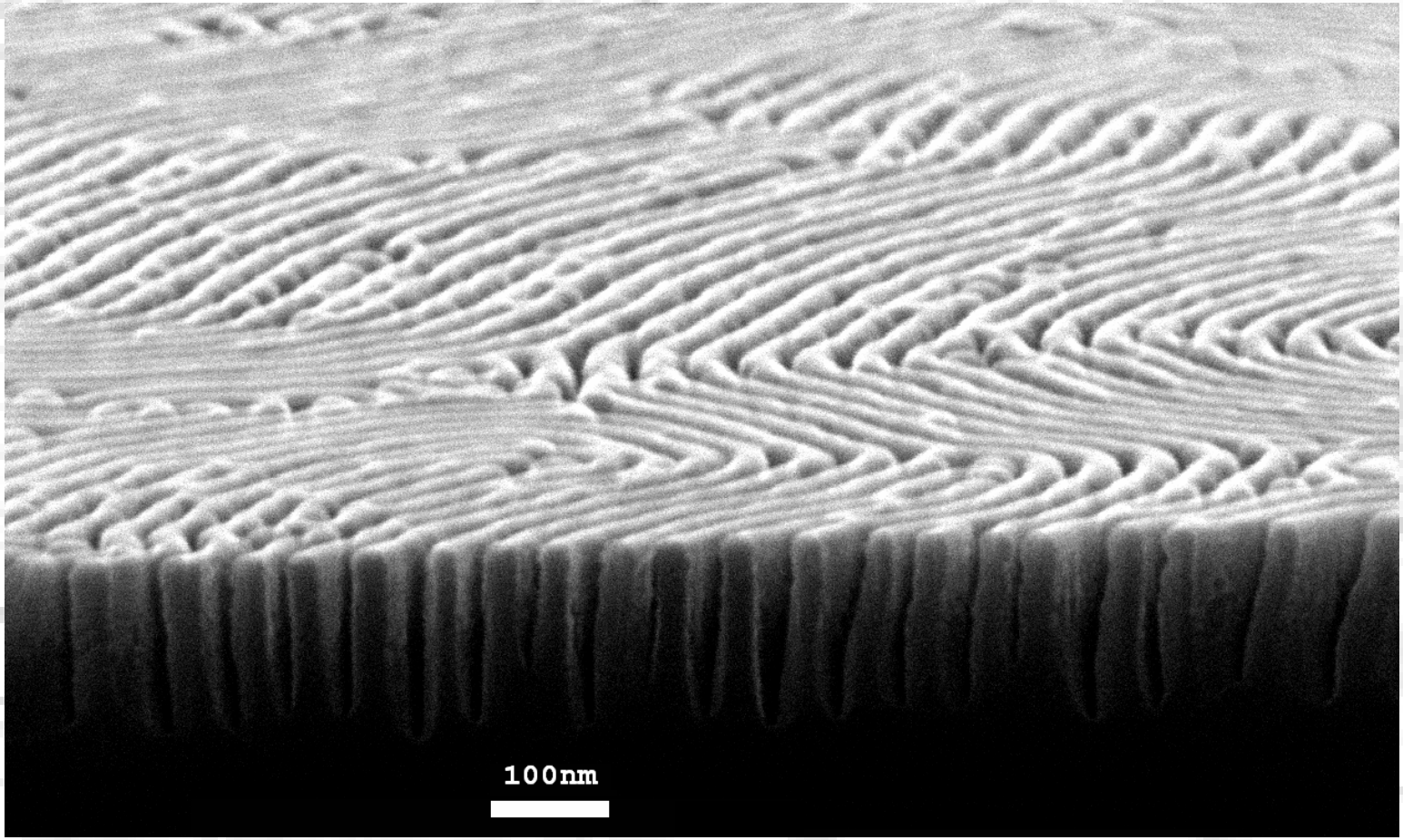
2011 EIPBN MicroGraph Contest

Micrograph Title:

Silicon Nano-Canyons

Description:

Cross-sectional view of dense silicon trenches, made using modified block-copolymer as etch mask.



Magnification (3"x4" image): 50000X

Instrument (Make and Model): JEOL 7500

Submitted by: Yu-Chih Tseng and Seth Darling

Affiliation: Center for Nanoscale Materials, Argonne National Laboratory

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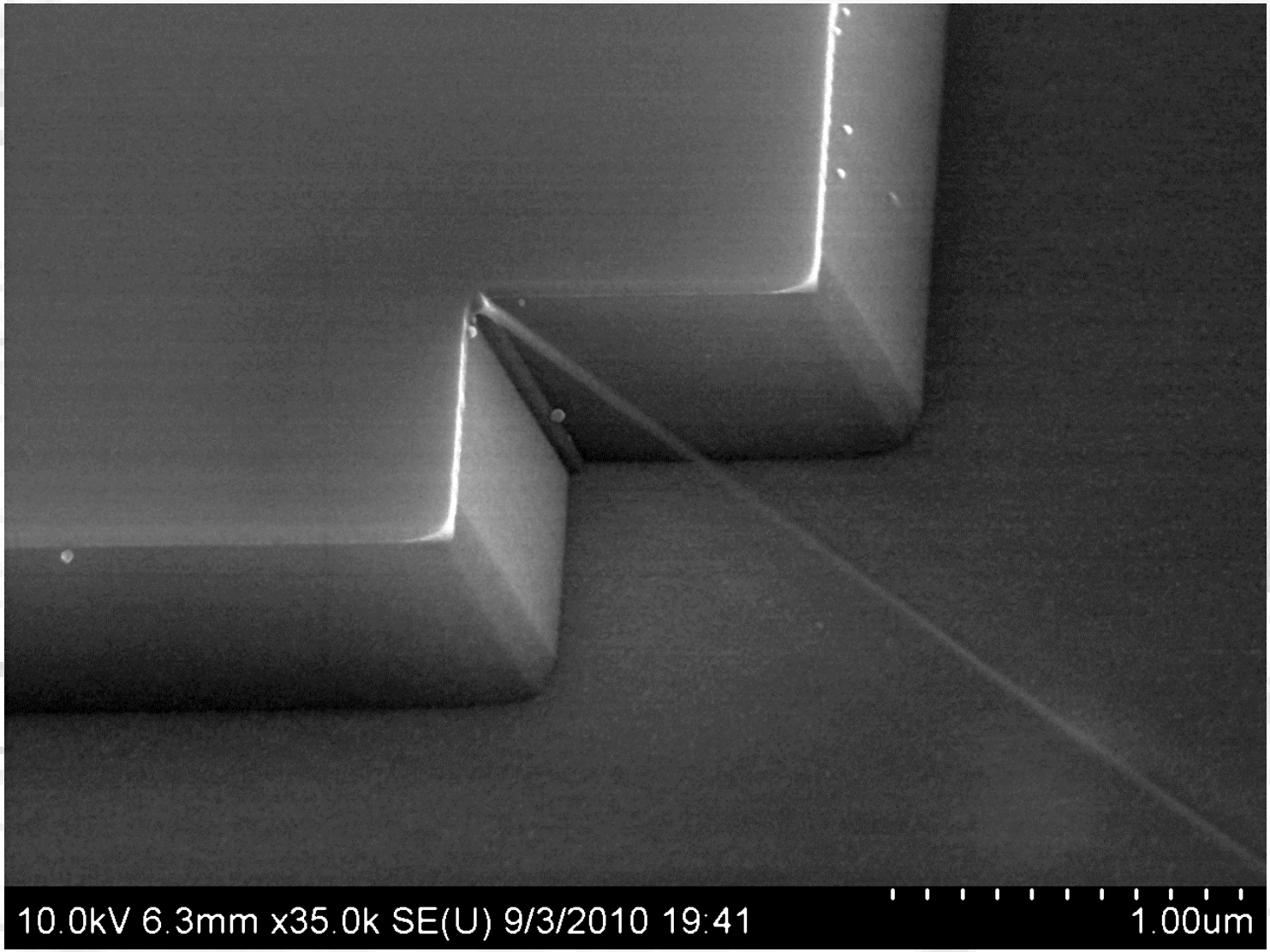
2011 EIPBN MicroGraph Contest

Micrograph Title:
Tiny Bridge Anchor Point 1

Description:
5 um long, sub-10 nm Silicon Carbon Nitride Doubly Clamped Cantilever on Silicon – Notice the clean and sharp edge!



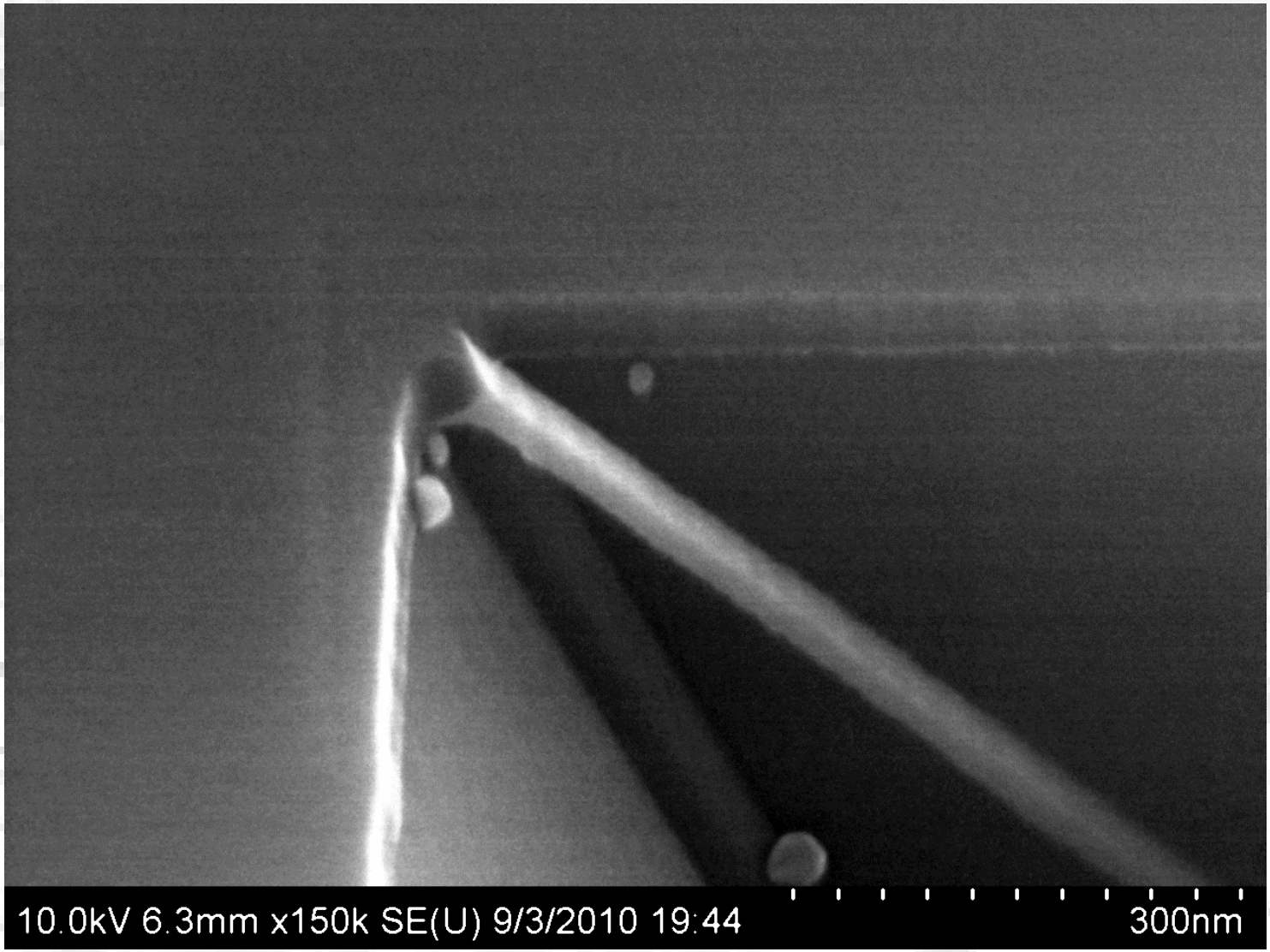
Magnification (3"x4" image): 35,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada *

2011 EIPBN MicroGraph Contest

Micrograph Title:
Tiny Bridge Anchor Point 2

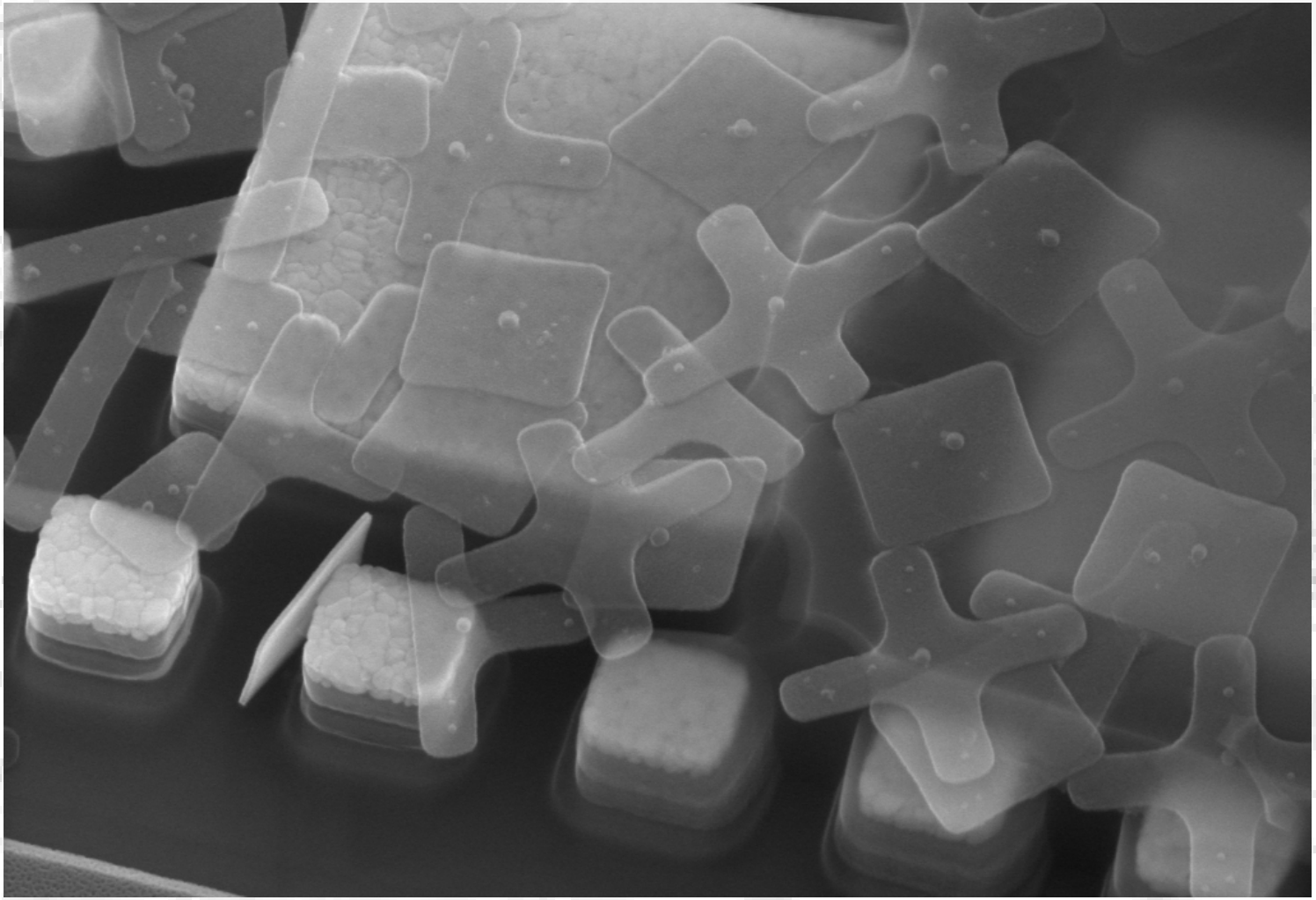
Description:
5 um long, 50 nm thick, sub-10 nm Silicon Carbon Nitride Doubly Clamped Cantilever on Silicon – Notice the sharp edge!



Magnification (3"x4" image): 150,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada *

2011 EIPBN MicroGraph Contest



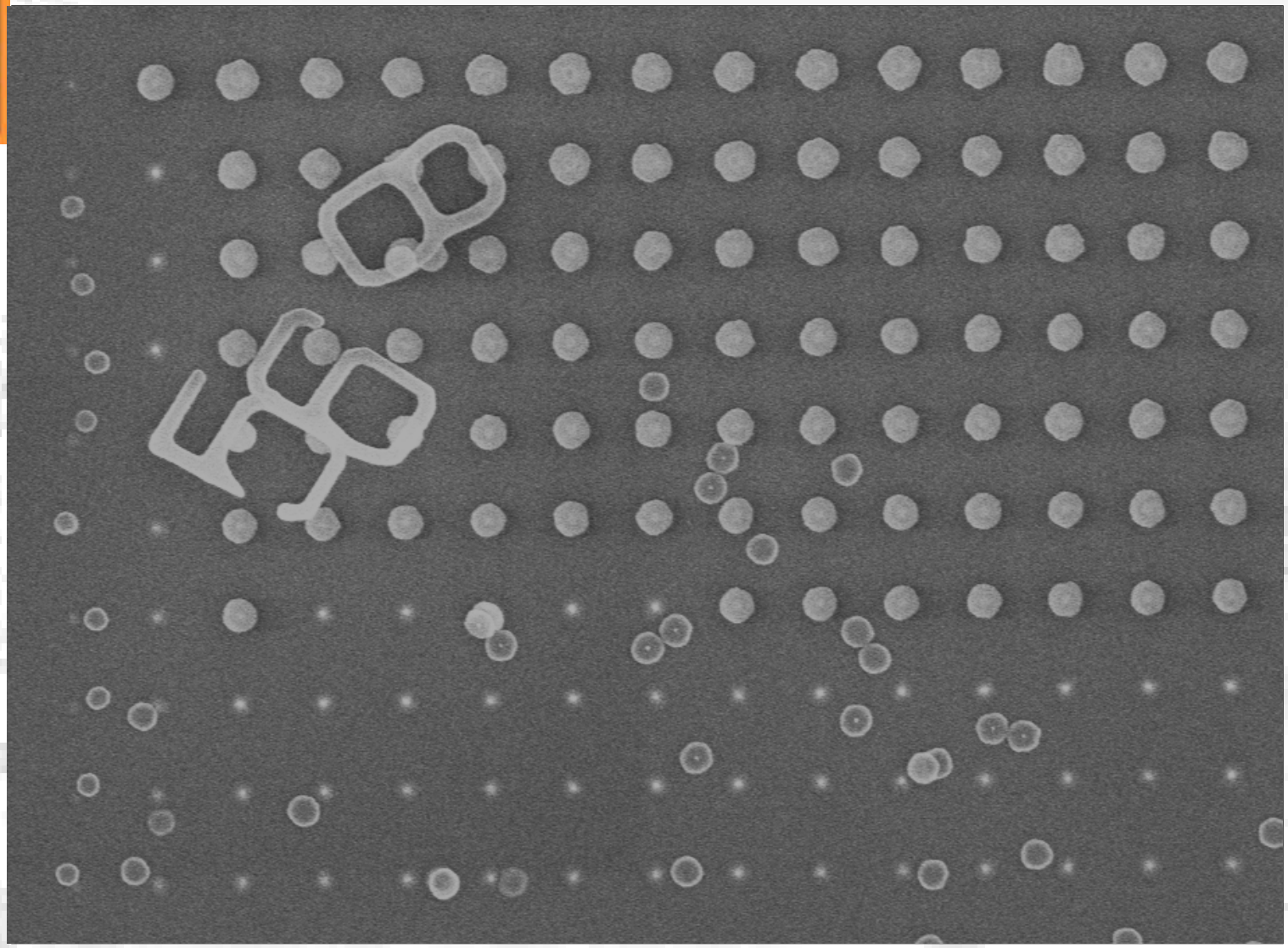
Micrograph Title:
The Persistence of Nanostructures

Description:
Semiconductor device with (apparent) lift-off debris

Magnification (3"x4" image): 34 kX
Submitted by: Larry Scipioni

Instrument (Make and Model): Carl Zeiss NTS, Ultra Plus FE-SEM
Affiliation: Carl Zeiss NTS

2011 EIPBN MicroGraph Contest



Micrograph Title: Gamble in Las Vegas

Description: Nanosized numbers flying around in gambling casion

Magnification (3"x4" image): 15k

Instrument (Make and Model): Raith 150

Submitted by: Hofer Manuel

Affiliation: TU Ilmenau Micro- and Nanoelectronic Systems

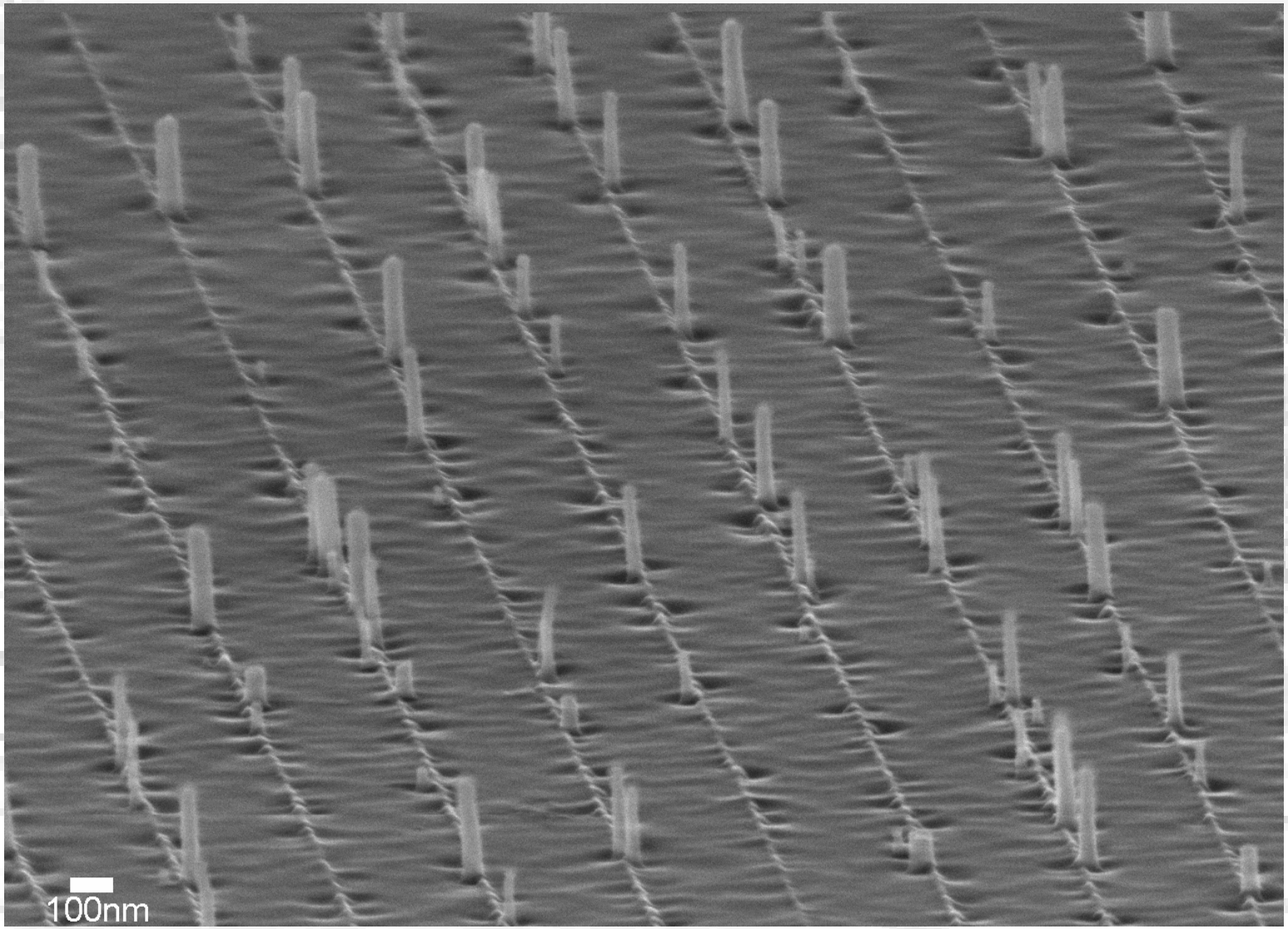
2011 EIPBN MicroGraph Contest

Micrograph Title:

Post-Apocalyptic Silicon City

Description:

Angled view of silicon pillars, made using hard-mask free etching



Magnification (3"x4" image): 20000X

Instrument (Make and Model): JEOL 7500

Submitted by: Yu-Chih Tseng and Seth Darling

Affiliation: Center for Nanoscale Materials, Argonne National Laboratory

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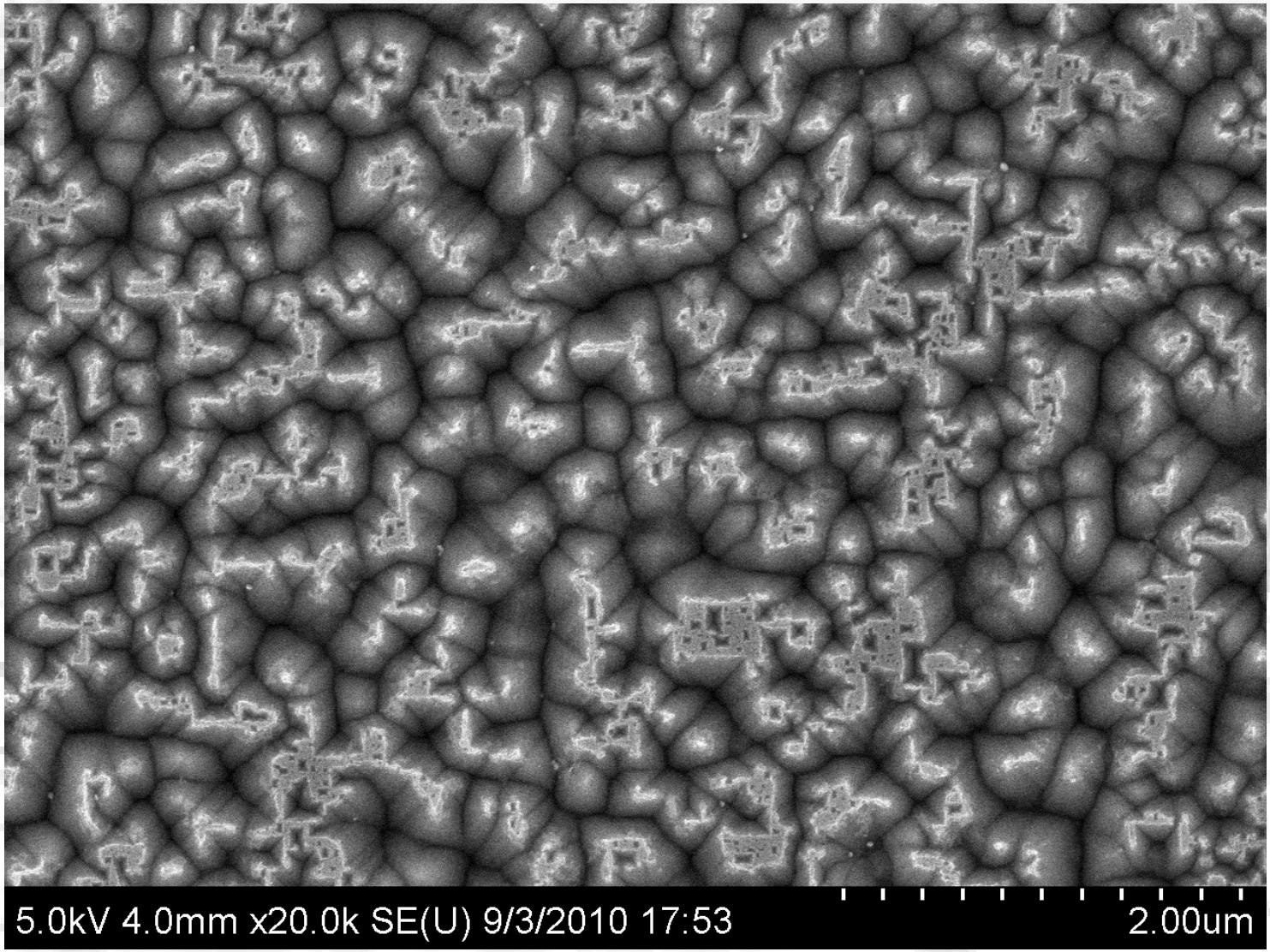
2011 EIPBN MicroGraph Contest

Micrograph Title:
Planet Kriptron

Description:
KOH etch gone bad with silicon carbon nitride particles micro-masking the silicon surface – the surface profile shows how KOH attacks silicon.



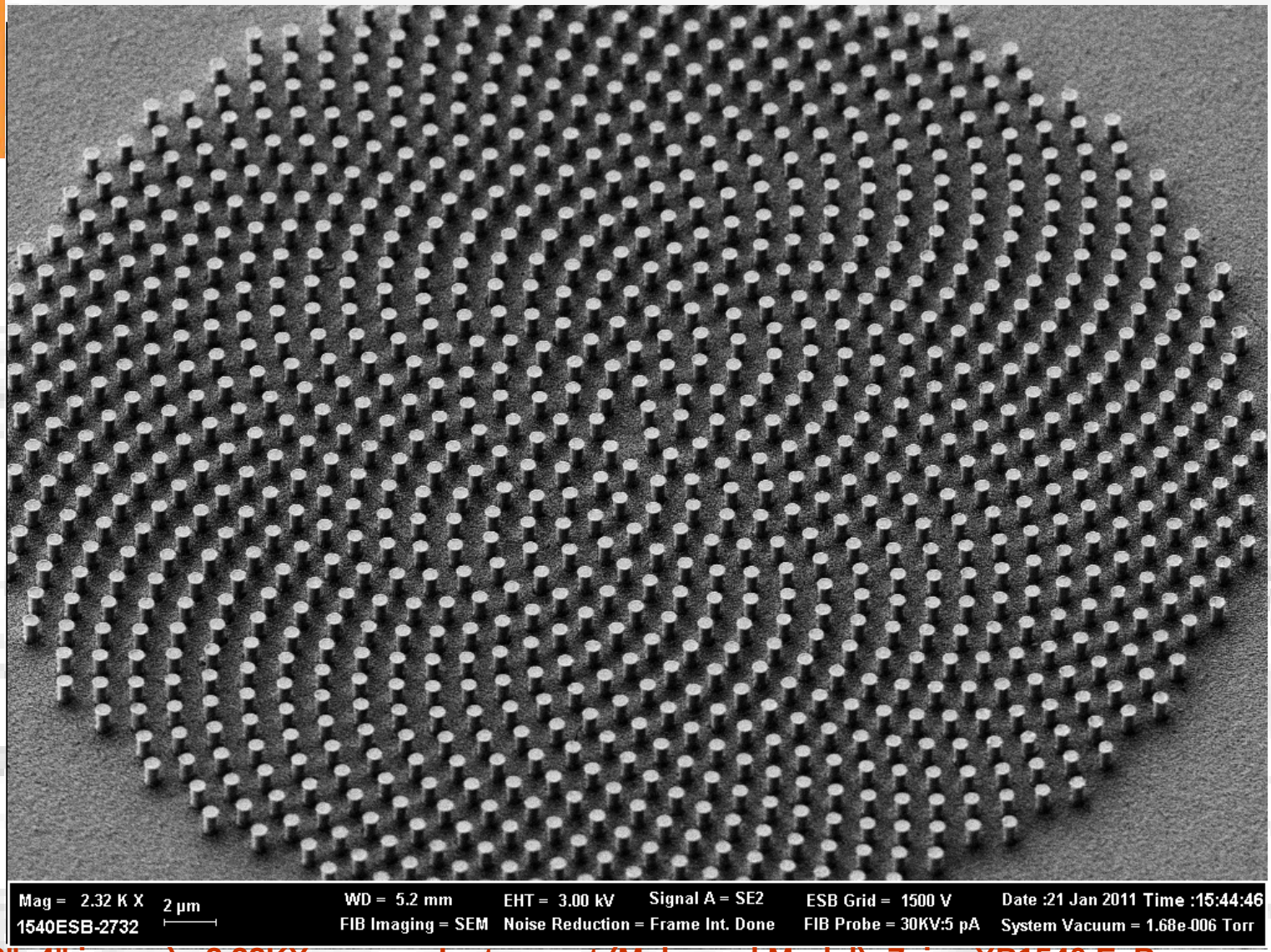
Magnification (3"x4" image): 20,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada

2011 EIPBN MicroGraph Contest

Micrograph Title:
Photonic Crystals Tornado

Description:
This is an aperiodic photonic structure fabricated on Er^{3+} doped SiNx



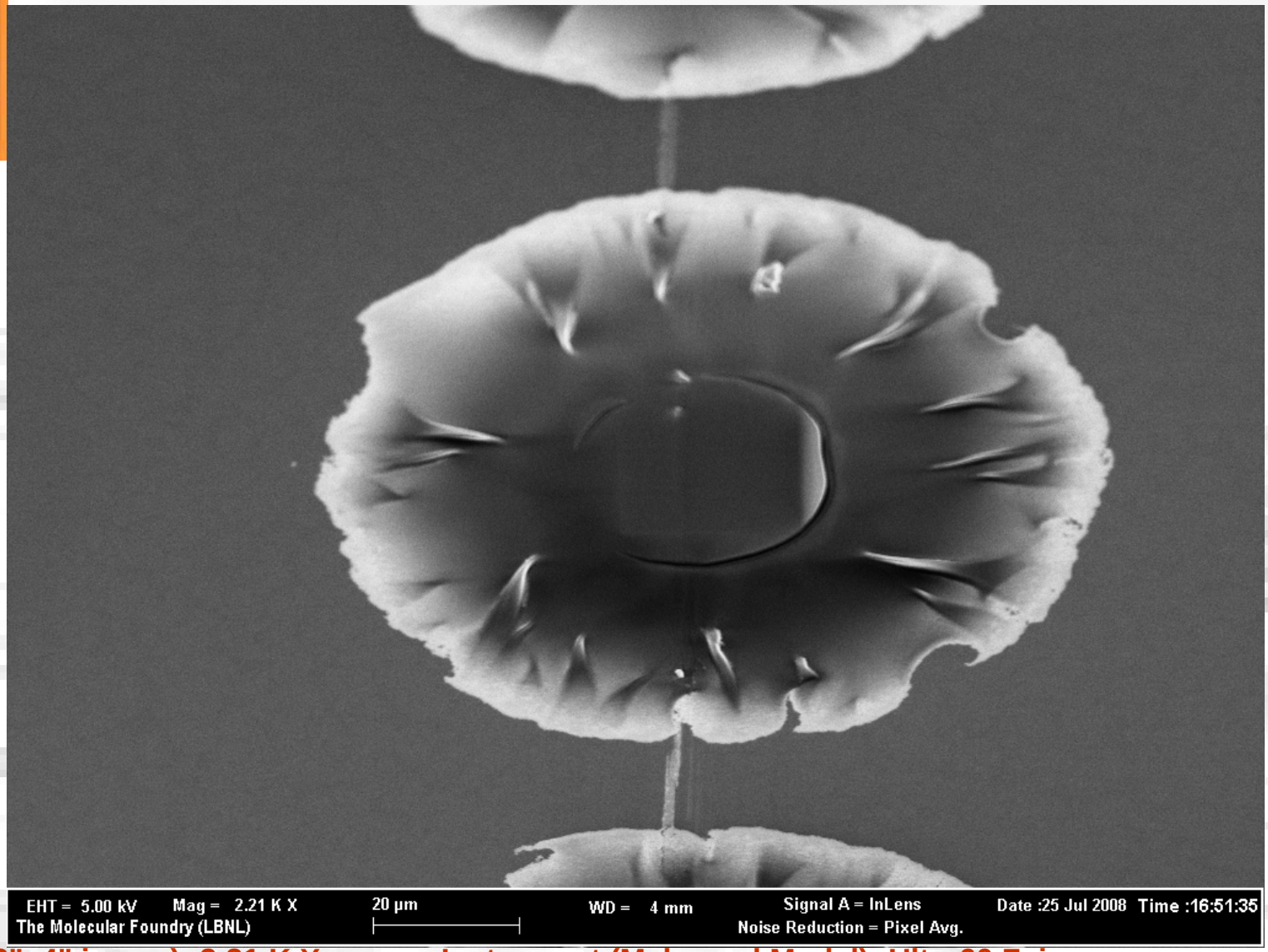
Magnification (3"x4" image): 2.32KX **Instrument (Make and Model): Zeiss XB1540 EsB**

Submitted by: Jingyu Zhang, Nate Lawrence, Deirdre Olynick, Stefano Cabrini and Luca Dal Negro
Affiliation: the Molecular Foundry, Lawrence Berkeley National Laboratory and Electrical Engineering Department, Boston University

2011 EIPBN MicroGraph Contest

Micrograph Title:
Micro Morning Glory

Description:
This is a Si pattern etched by ICP



Magnification (3"x4" image): 2.21 K X
Instrument (Make and Model): Ultra60 Zeiss

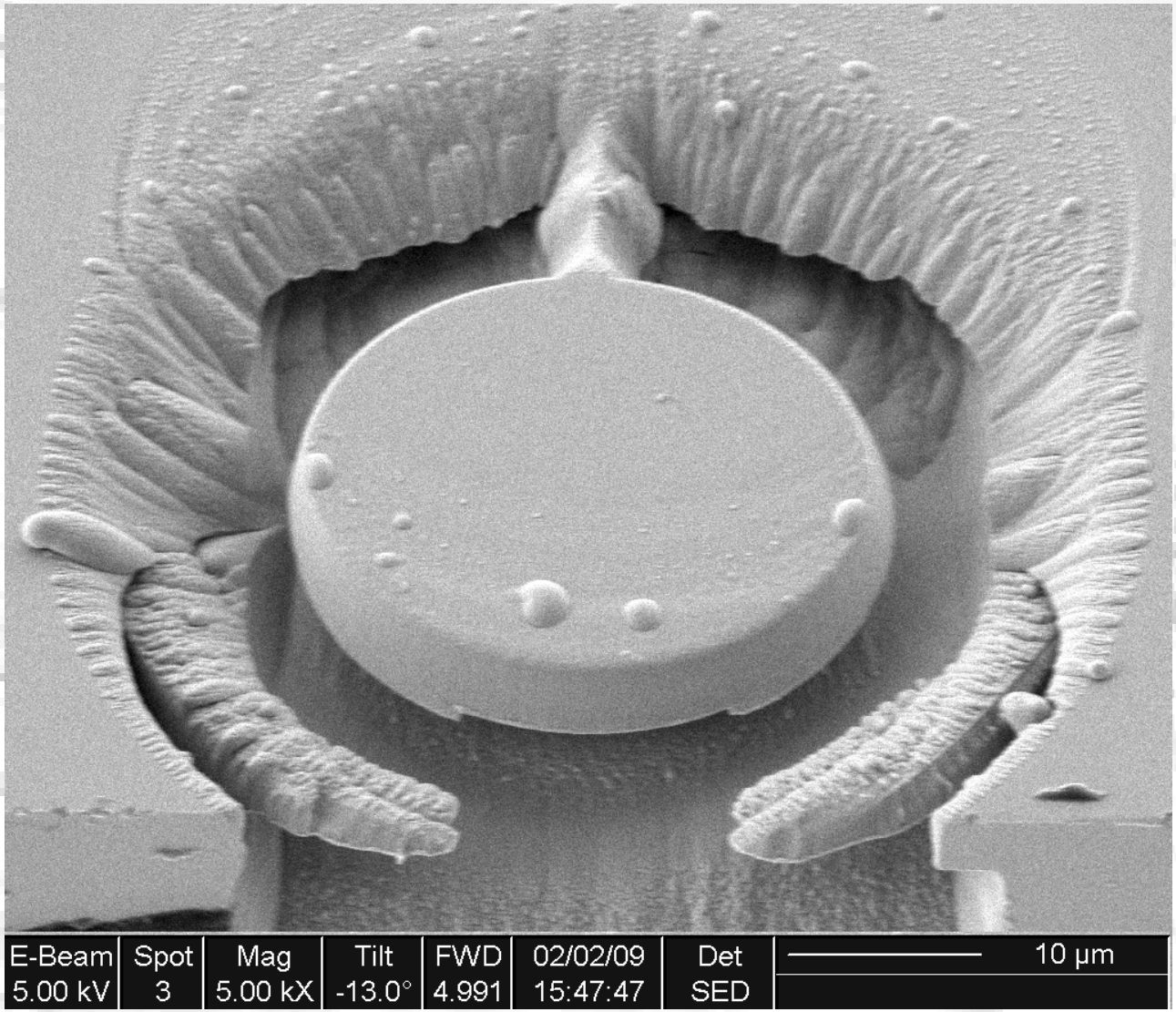
Submitted by: Deirdre Olynick, Jingyu Zhang and Stefano Cabrini
Affiliation: Nanofabrication group, the Molecular Foundry, Lawrence Berkeley National Laboratory

2011 EIPBN MicroGraph Contest

Micrograph Title:
MicroConstellation

Cancer

Description:
Surface globules as stars in the constellation crab or cancer



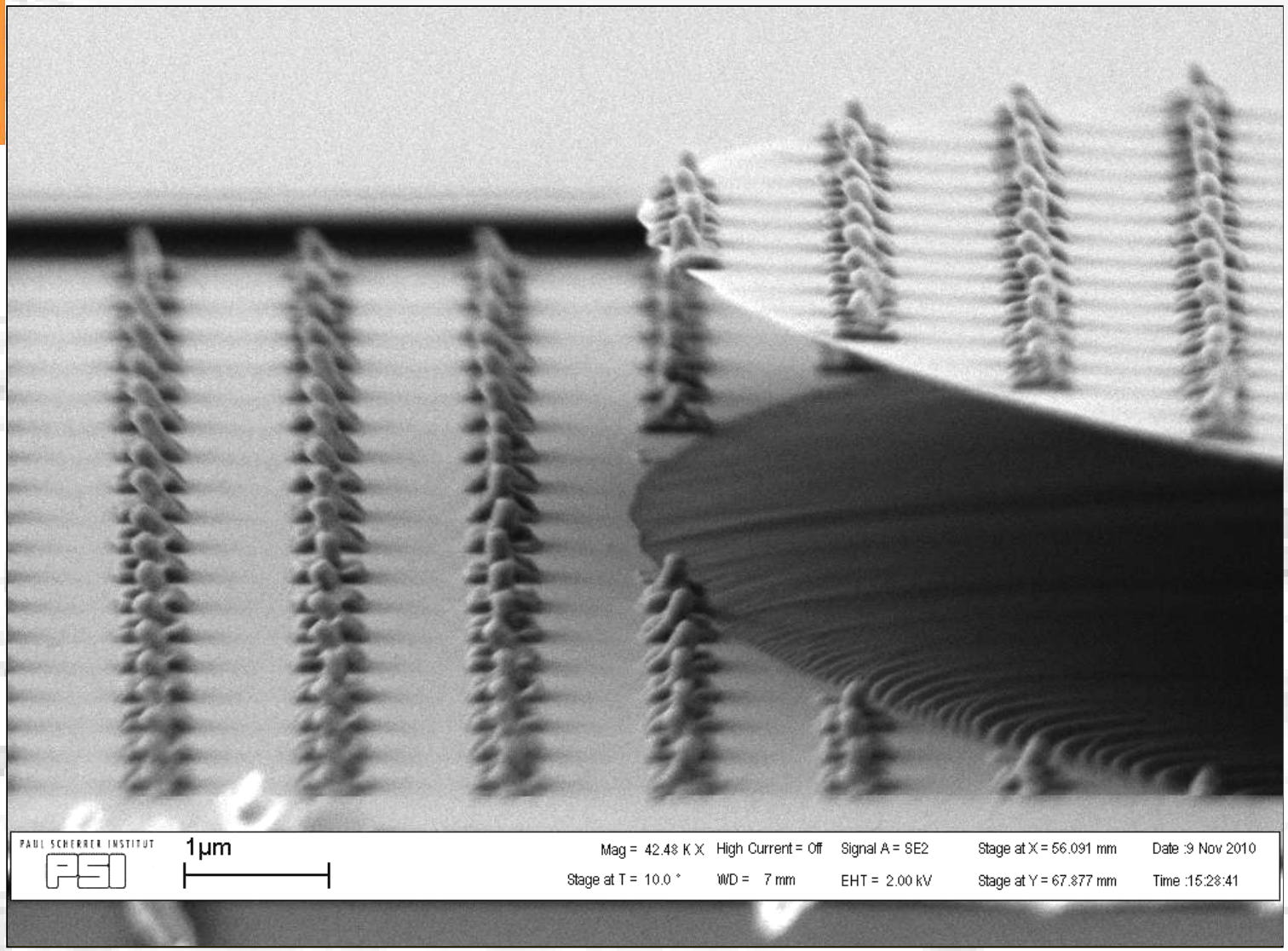
Magnification (3"x4" image): **5000x**
Submitted by: **Hozanna Miro and Paul Alkemade**

Instrument (Make and Model): **FEI Strata DB235**
Affiliation: **Delft University of Technology**

2011 EIPBN MicroGraph Contest

Micrograph Title:
Space Invaders

Description:
array of multi-tier pattern on defective silicon substrate



Magnification (3"x4" image): **42.48KX**
Instrument (Make and Model): **Carl Zeiss SUPRA 55 VP**
Submitted by: **Arne Schleunitz**
Affiliation: **Paul Scherrer Institut (Switzerland)**

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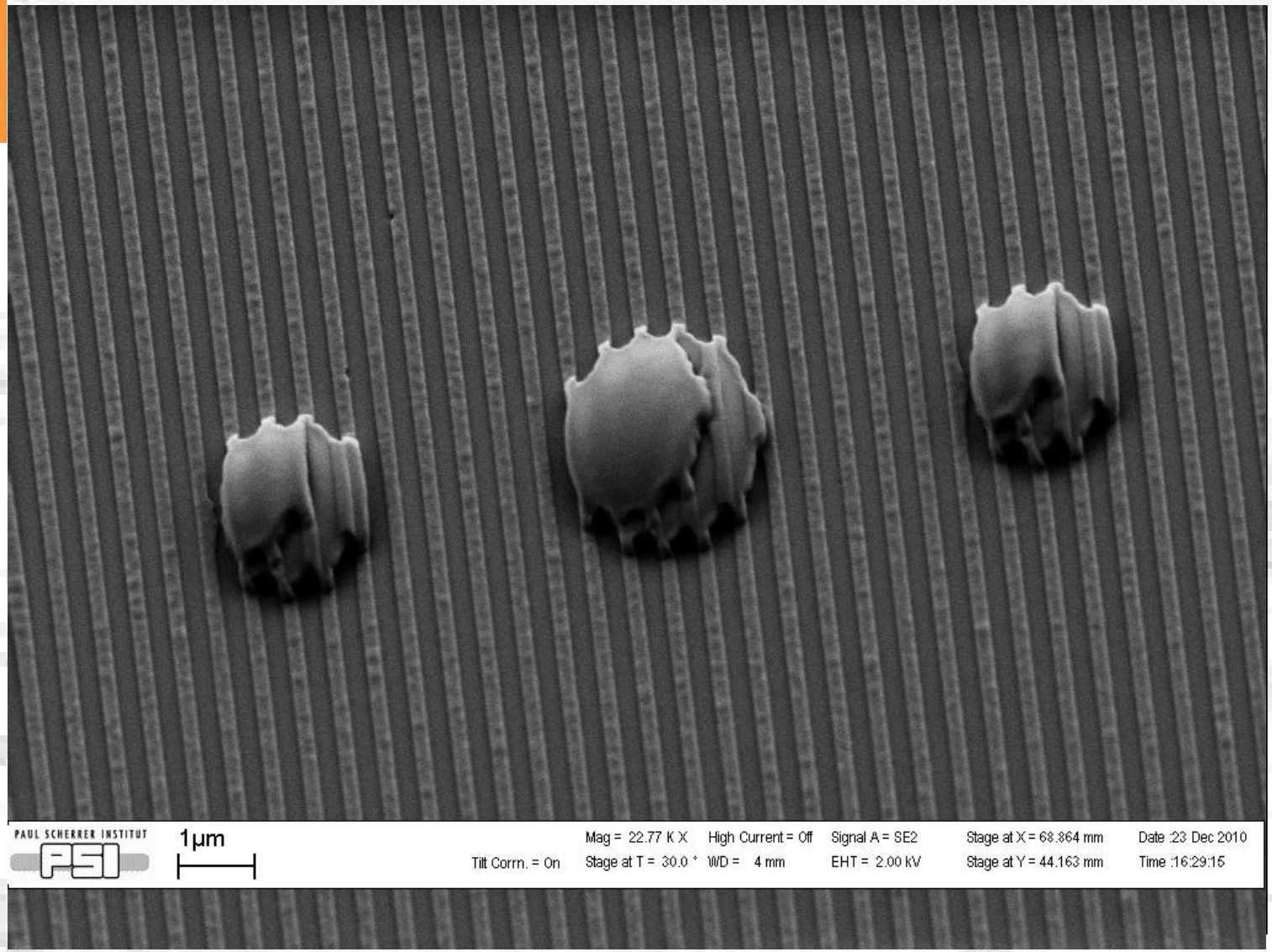
2011 EIPBN MicroGraph Contest

Micrograph Title:
lovely loving Ladybugs

Description:
incomplete replication of hybrid 3-D mold



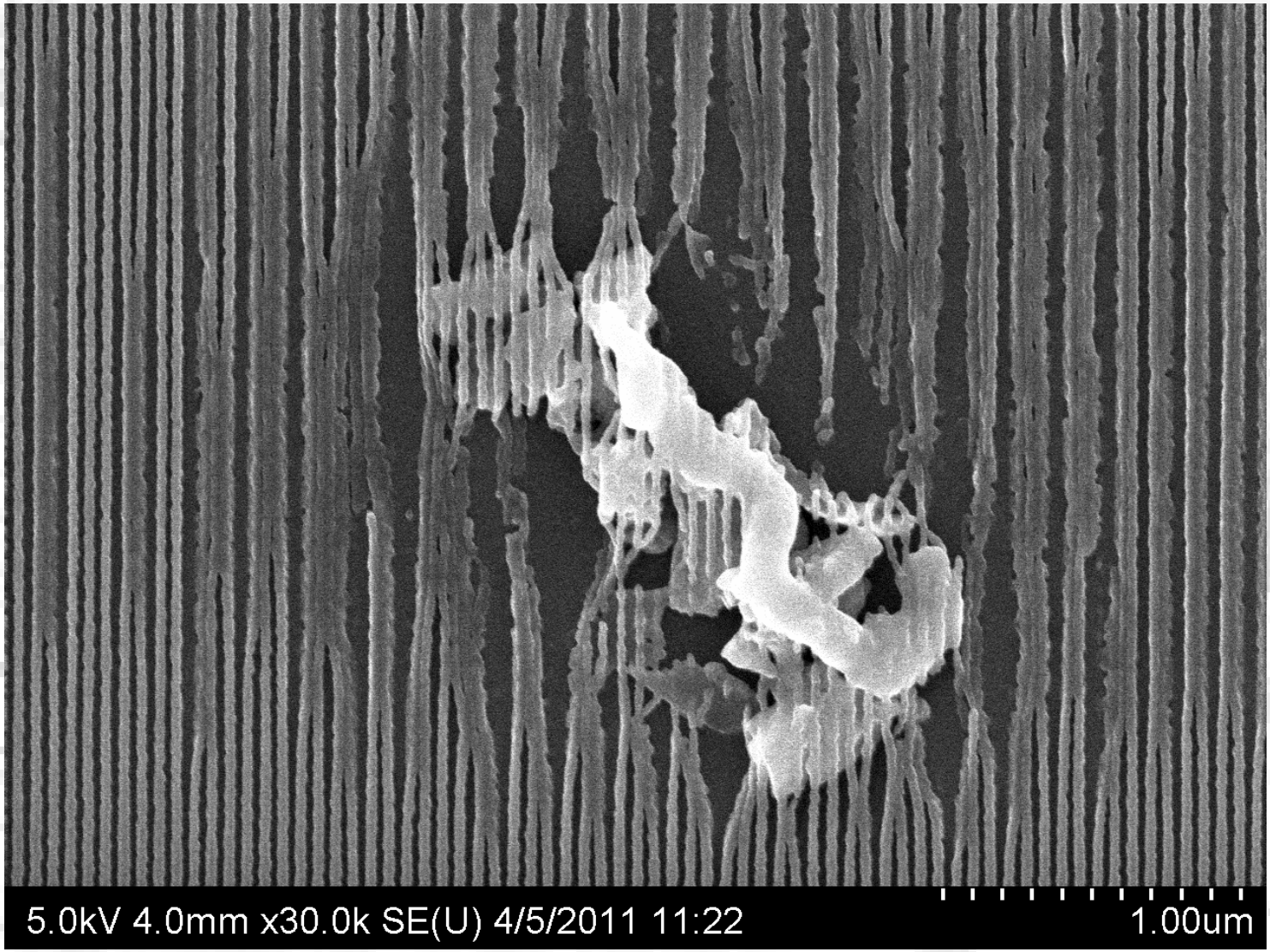
Magnification (3"x4" image): **22.77KX**
Submitted by: **C.Spreu, A. Schleunitz**

Instrument (Make and Model): **Carl Zeiss SUPRA 55 VP**
Affiliation: **Paul Scherrer Institut (Switzerland)**

2011 EIPBN MicroGraph Contest

Micrograph Title:
Spider's Meal

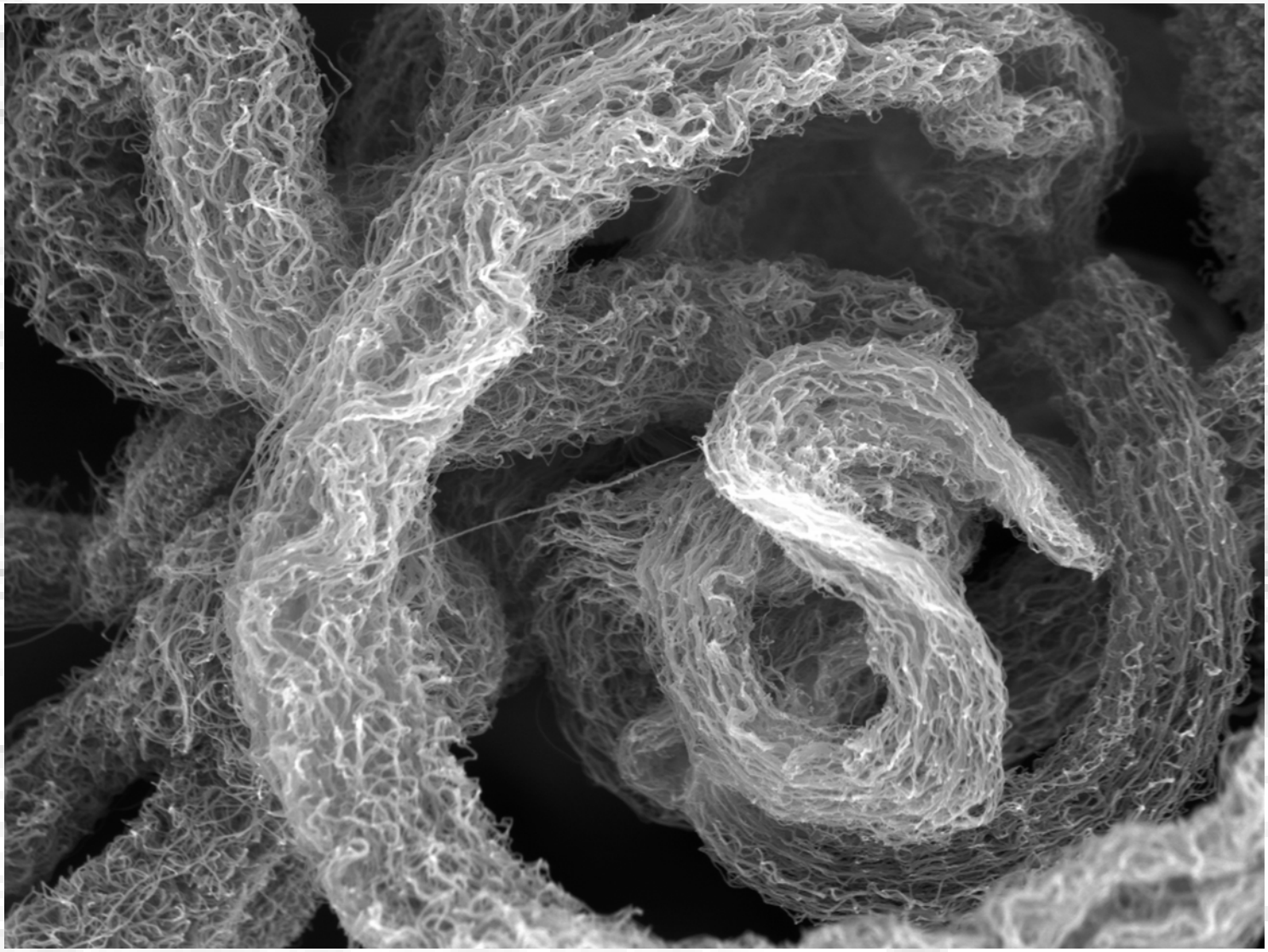
Description:
A particle that looks like it is caught in a web of PMMA gratings



Magnification (3"x4" image): 30,000x
Submitted by: Mohammad Ali Mohammad

Instrument (Make and Model): Hitachi S-4800
Affiliation: University of Alberta, Edmonton, Canada

2011 EIPBN MicroGraph Contest



Micrograph Title: Nanotube Nebula

Description: SEM image of bundled carbon nanotubes with a thin coating of SiO.

Magnification (3"x4" image): 25000X

Instrument (Make and Model): FEI Nova Nanolab 600

Submitted by: Matthew Bresin

Affiliation: College of Nanoscale Science and Engineering, SUNY Albany

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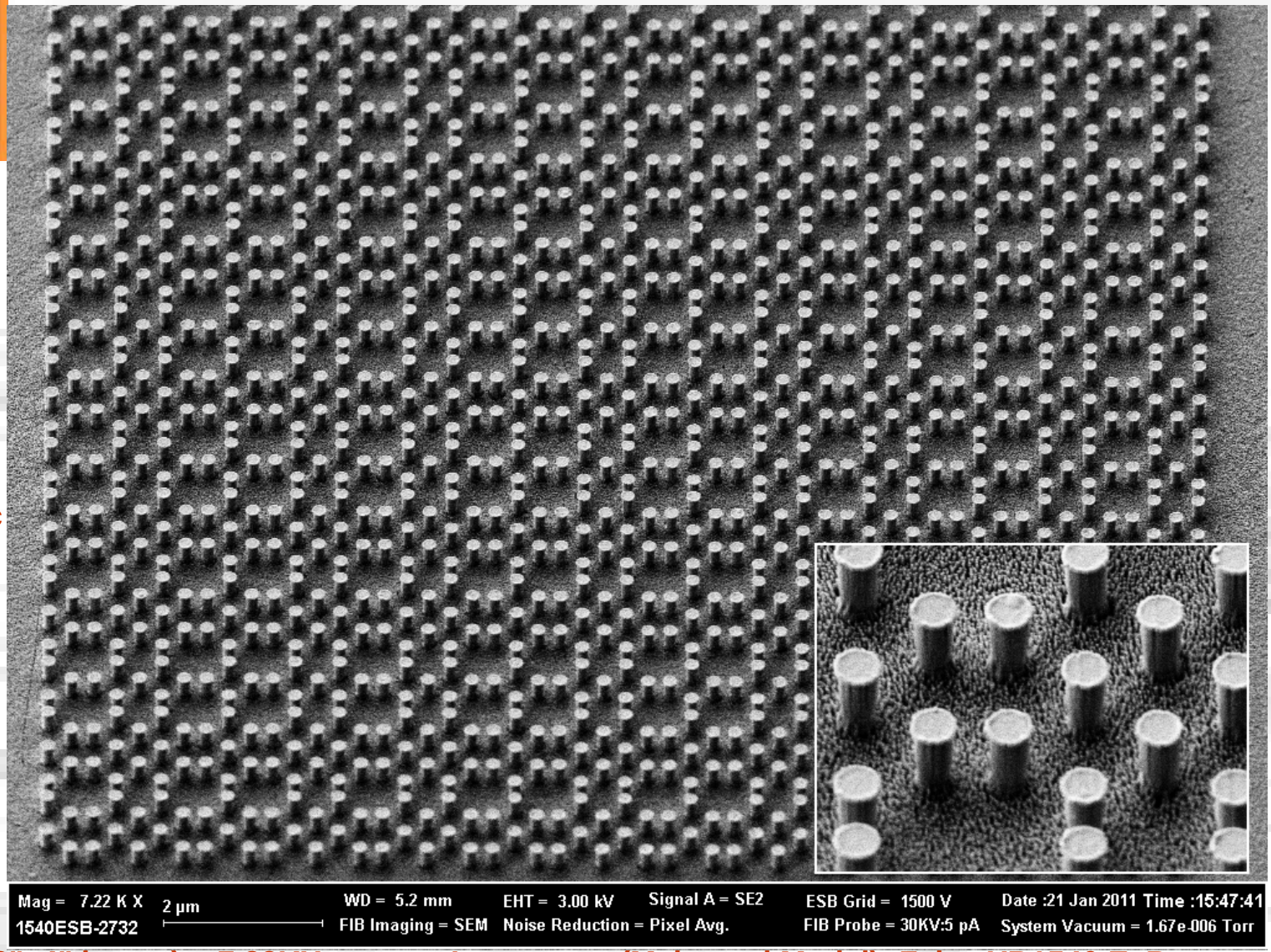
2011 EIPBN MicroGraph Contest

Micrograph Title:
Photonic Chessboard

Description:
This is an aperiodic photonic structure fabricated on Er^{3+} doped SiNx



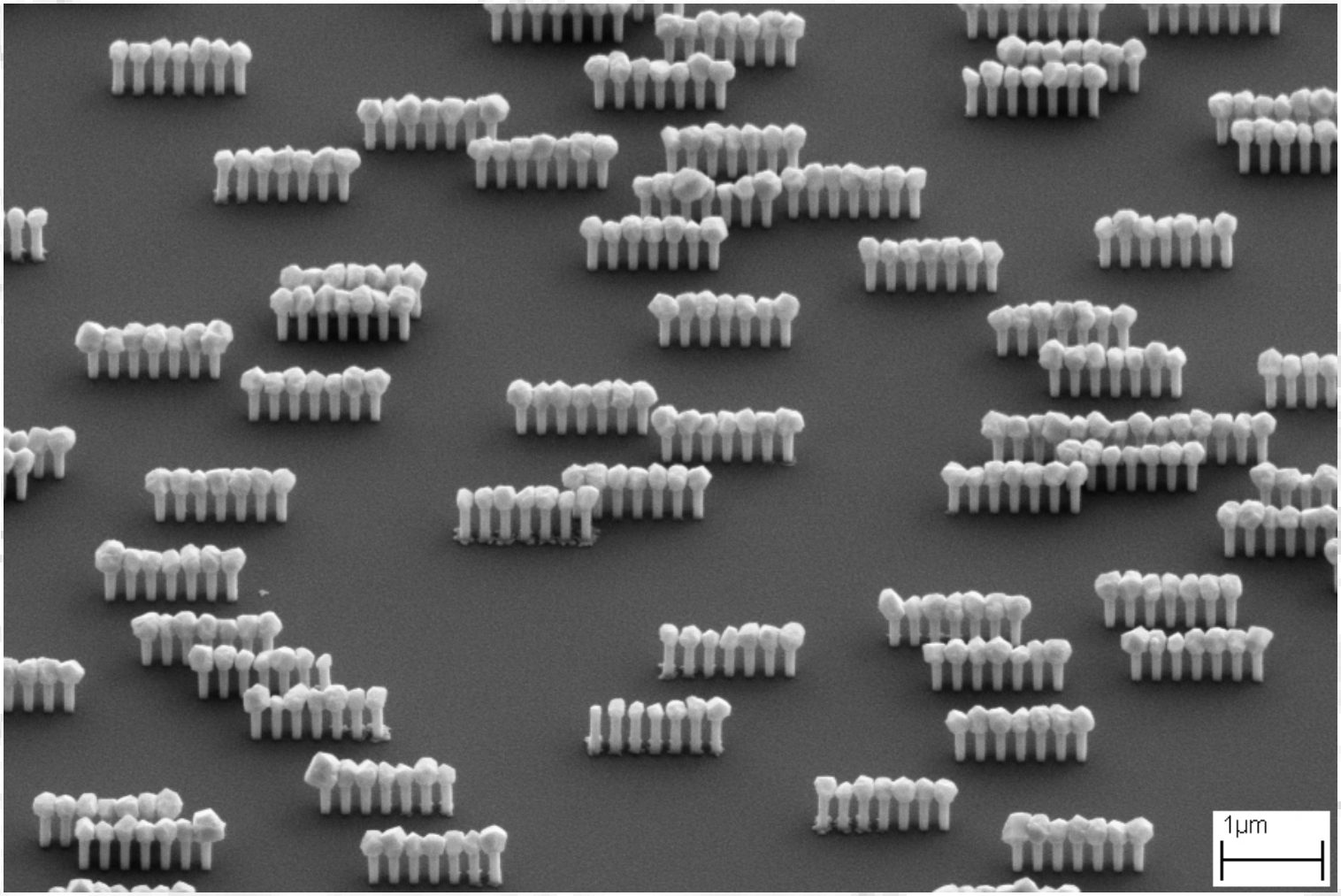
Magnification (3"x4" image): 7.22KX **Instrument (Make and Model): Zeiss XB1540 EsB**

Submitted by: Jingyu Zhang, Nate Lawrence, Deirdre Olynick, Stefano Cabrini and Luca Dal Negro
Affiliation: the Molecular Foundry, Lawrence Berkeley National Laboratory and Electrical Engineering Department, Boston University

2011 EIPBN MicroGraph Contest

Micrograph Title:
Las Vegas Nano-Strip

Description:
Overgrown Au electroplated structures in PMMA mold



Magnification (3"x4" image): **25kx**

Instrument (Make and Model): **SEM Zeiss Supra 55VP**

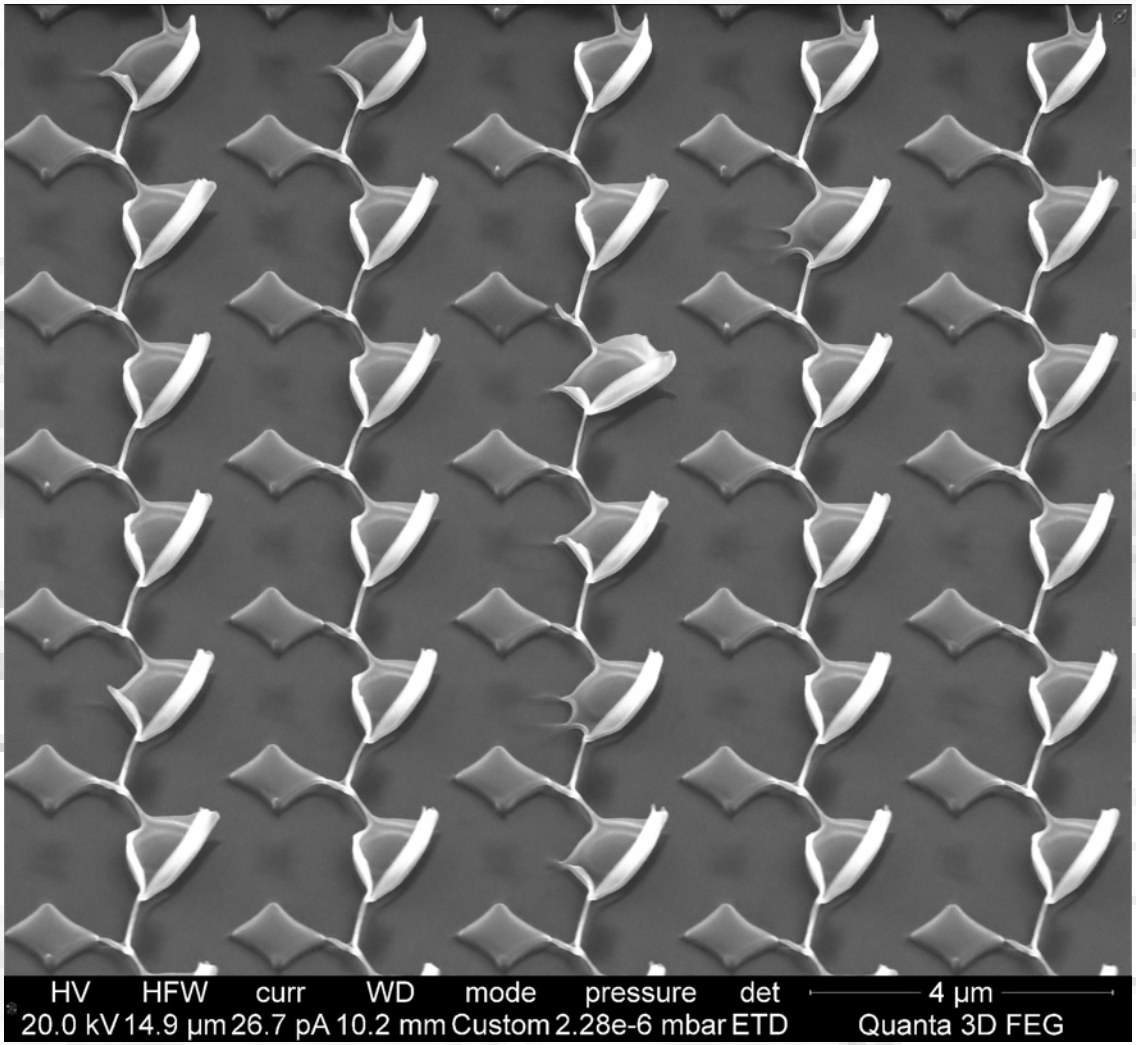
Submitted by: **Joan Vila-Comamala**
Argonne National Laboratory (USA)

Affiliation: **Paul Scherrer Institut (Switzerland)**

2011 EIPBN MicroGraph Contest

Micrograph Title: The holly and ivy

Description: During milling of Si3N4 layer we found the holly and the ivy



Magnification (3"x4" image): 10000X
Submitted by: V.G. Kutchoukov, P. Kruit

Instrument (Make and Model): FEI Quanta 3D FEG
Affiliation: TUDelft, The Netherlands

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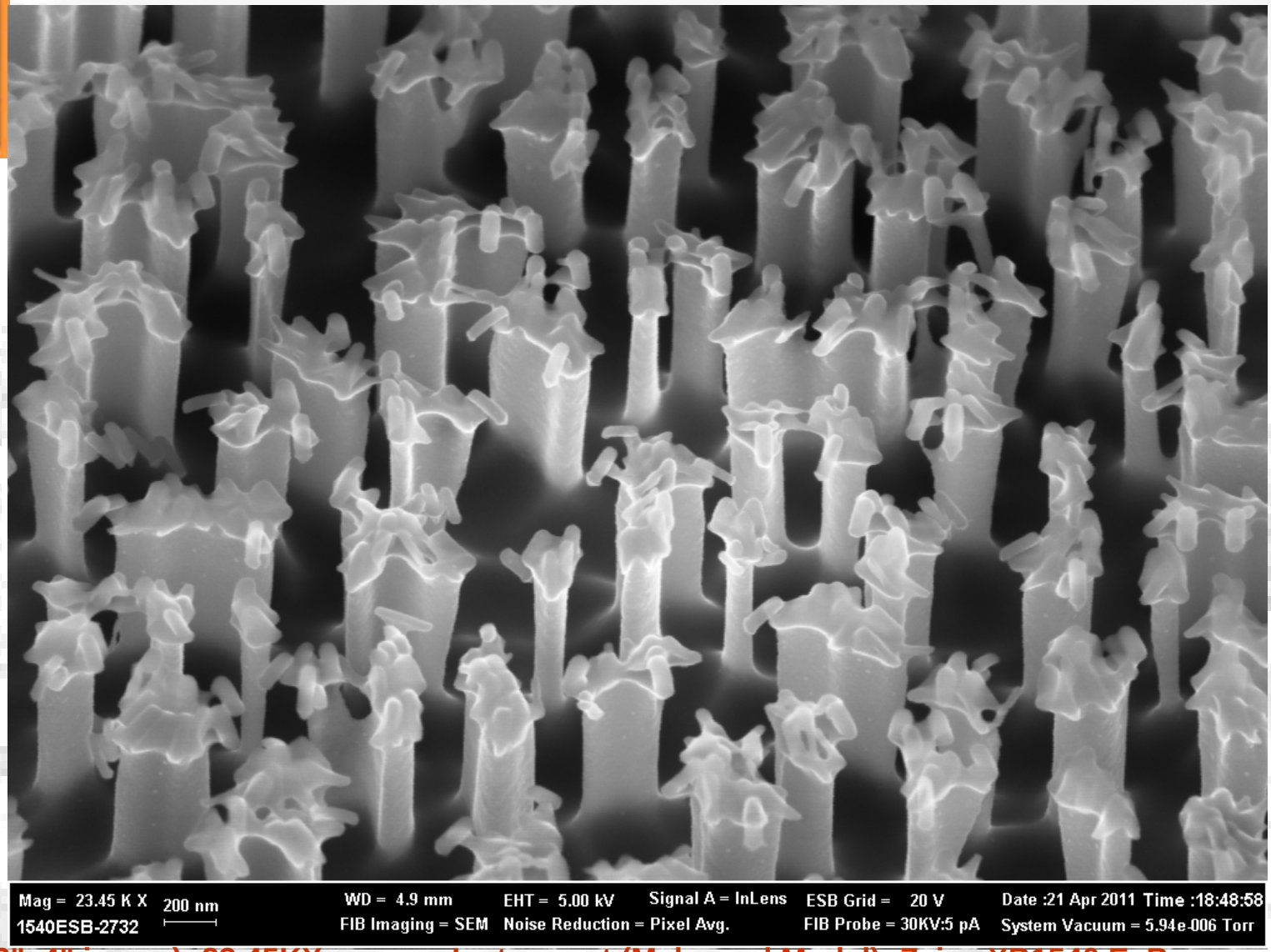
2011 EIPBN MicroGraph Contest

Micrograph Title:
Nano tropical forest

Description:
This Si structure is etched by ICP with falling ebeam resist mask



Magnification (3"x4" image): 23.45KX **Instrument (Make and Model): Zeiss XB1540 EsB**

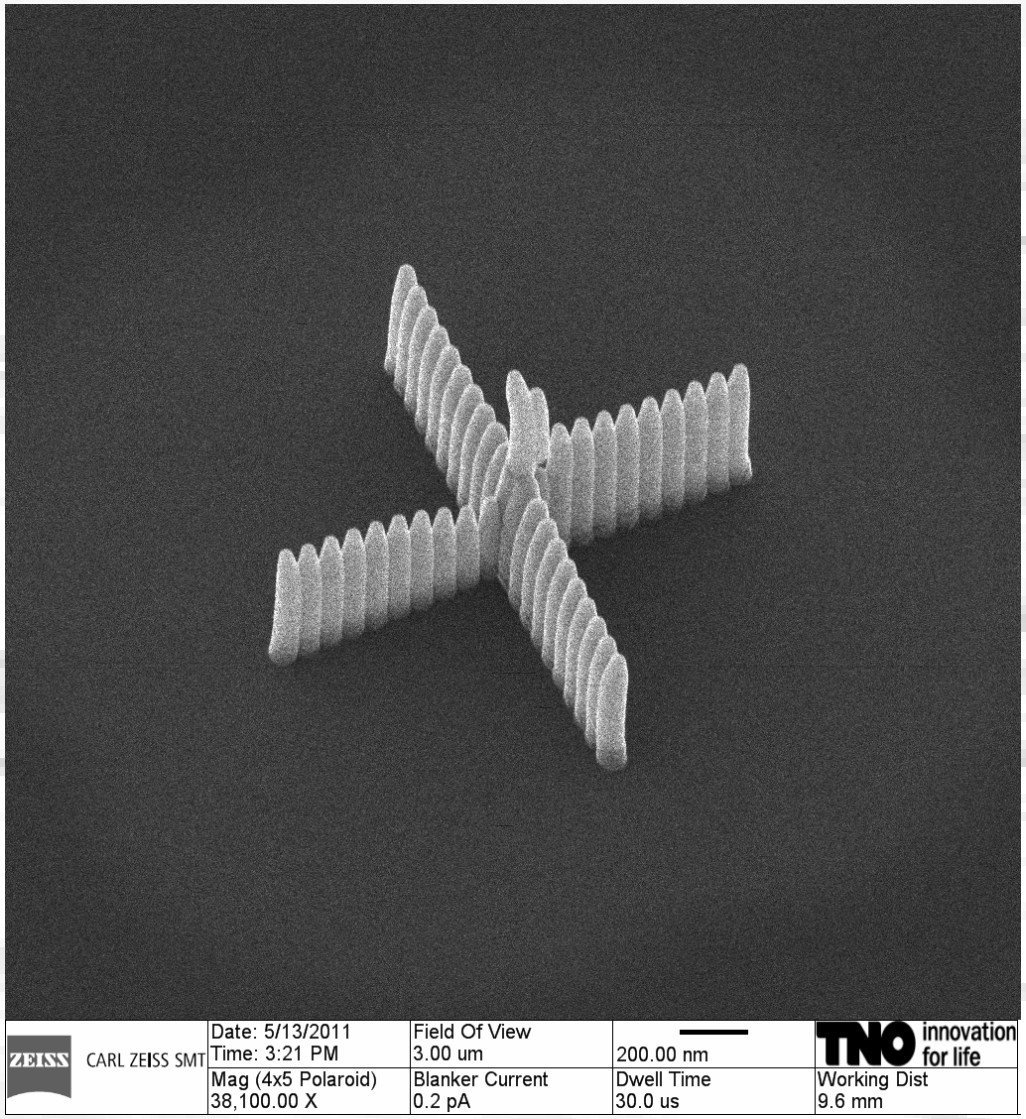
Submitted by: Jingyu Zhang, Deirdre Olynick and Stefano Cabrini

Affiliation: Nanofabrication group, the Molecular Foundry, Lawrence Berkeley National Laboratory

2011 EIPBN MicroGraph Contest

Micrograph Title:
Even on the smallest scales, the Dutch will build their windmills

Description:
Nano pillars forming a small windmill.



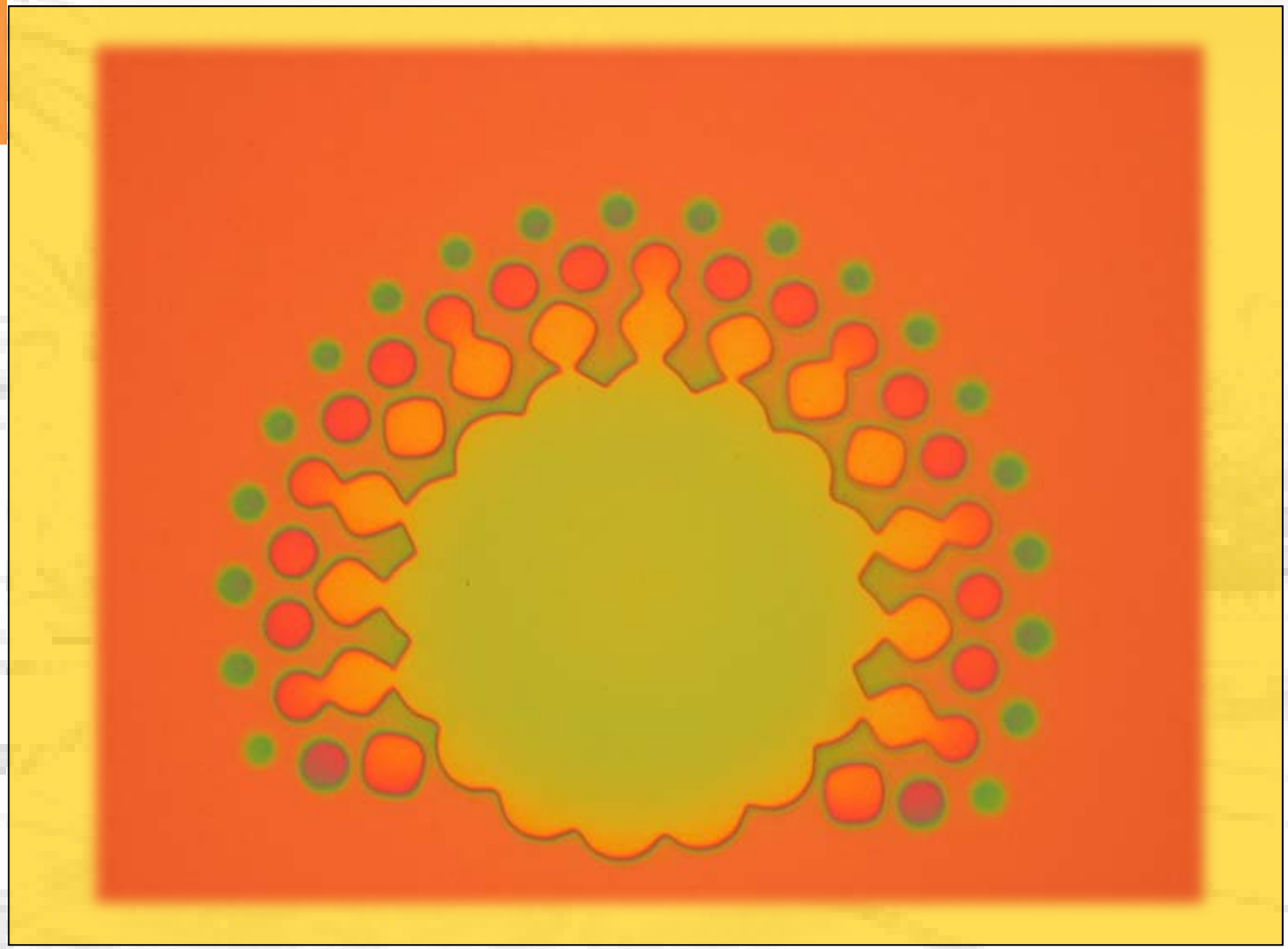
Magnification (3"x4" image): **38100x**

Instrument (Make and Model): **Zeiss Orion+ HIM**

Submitted by: **Emma Koster and Paul Alkemade**

Affiliation: **Delft University of Technology**

2011 EIPBN MicroGraph Contest



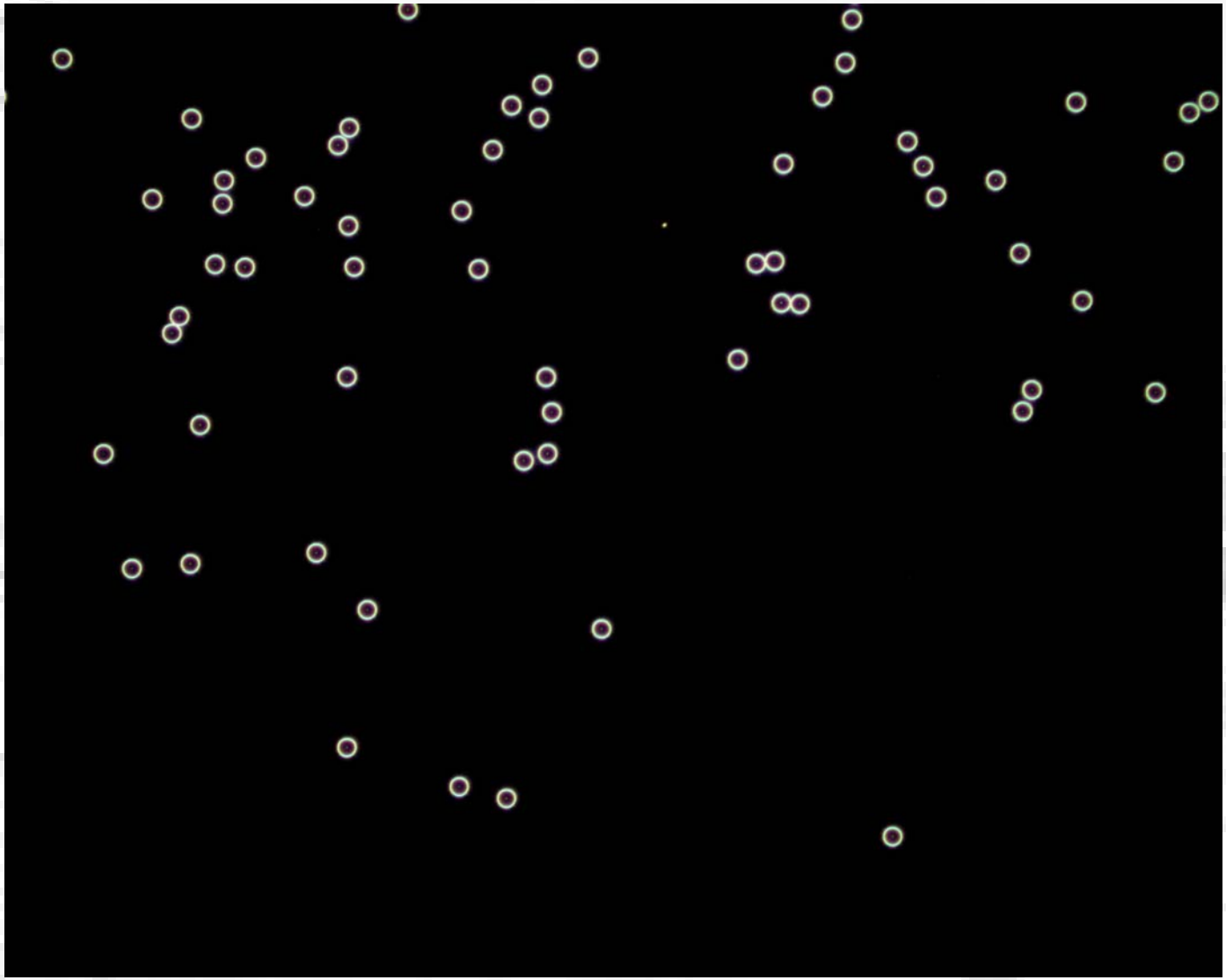
Micrograph Title:
Optical Peacock

Description:
Patterns with various thicknesses etched in a SiN membrane through apertures in a compliant stencil membrane

Magnification (3"x4" image): x50
Submitted by: Veronica Savu

Instrument (Make and Model): Nikon Eclipse L200
Affiliation: EPFL

2011 EIPBN MicroGraph Contest



Micrograph Title: The Big Dipper

Description:
A sighting of the big dipper, with the rarely visible star M108 near the lower right corner. Or, perhaps, an array of photoresist circles that have suffered some adhesion difficulties.

Magnification (3"x4" image): 410
Submitted by: Steve Hickman

Instrument (Make and Model): Nikon Eclipse L200
Affiliation: Harvard Center for Nanoscale Systems

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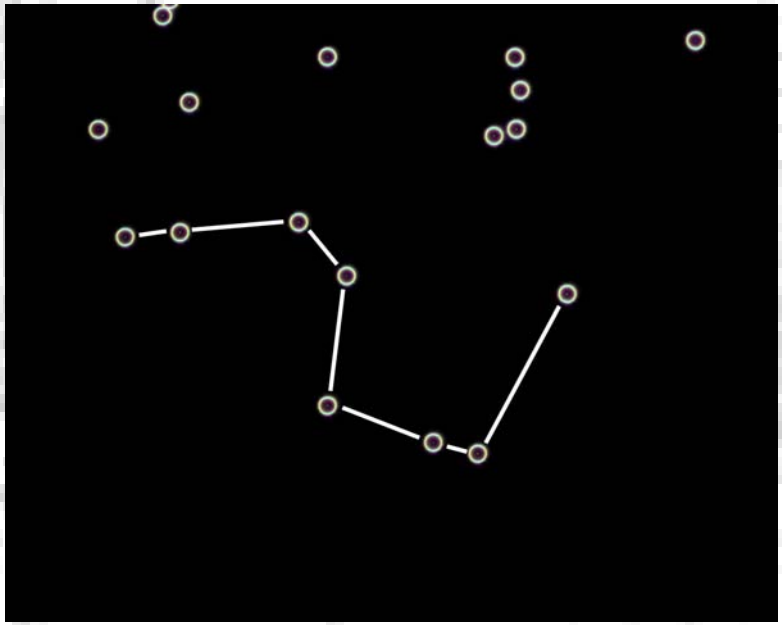
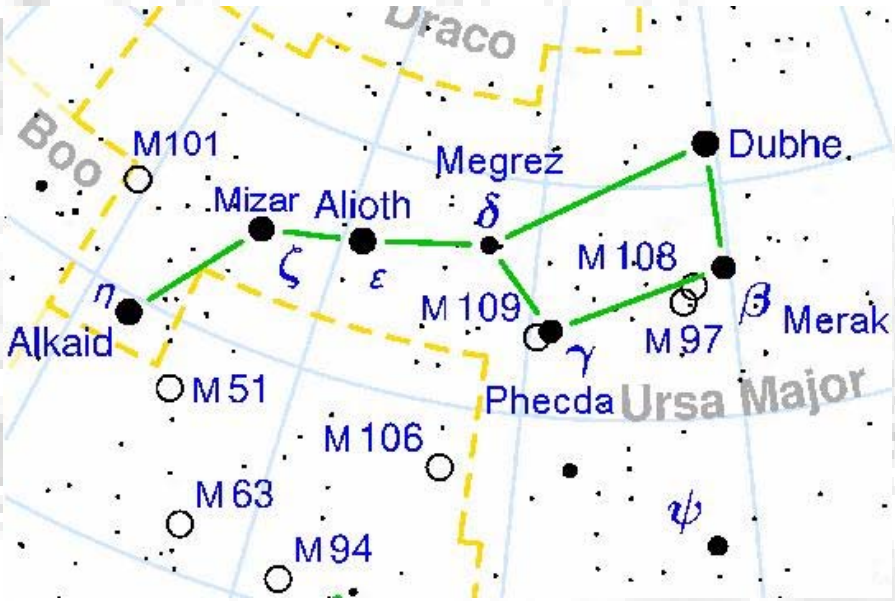
2011 EIPBN MicroGraph Contest





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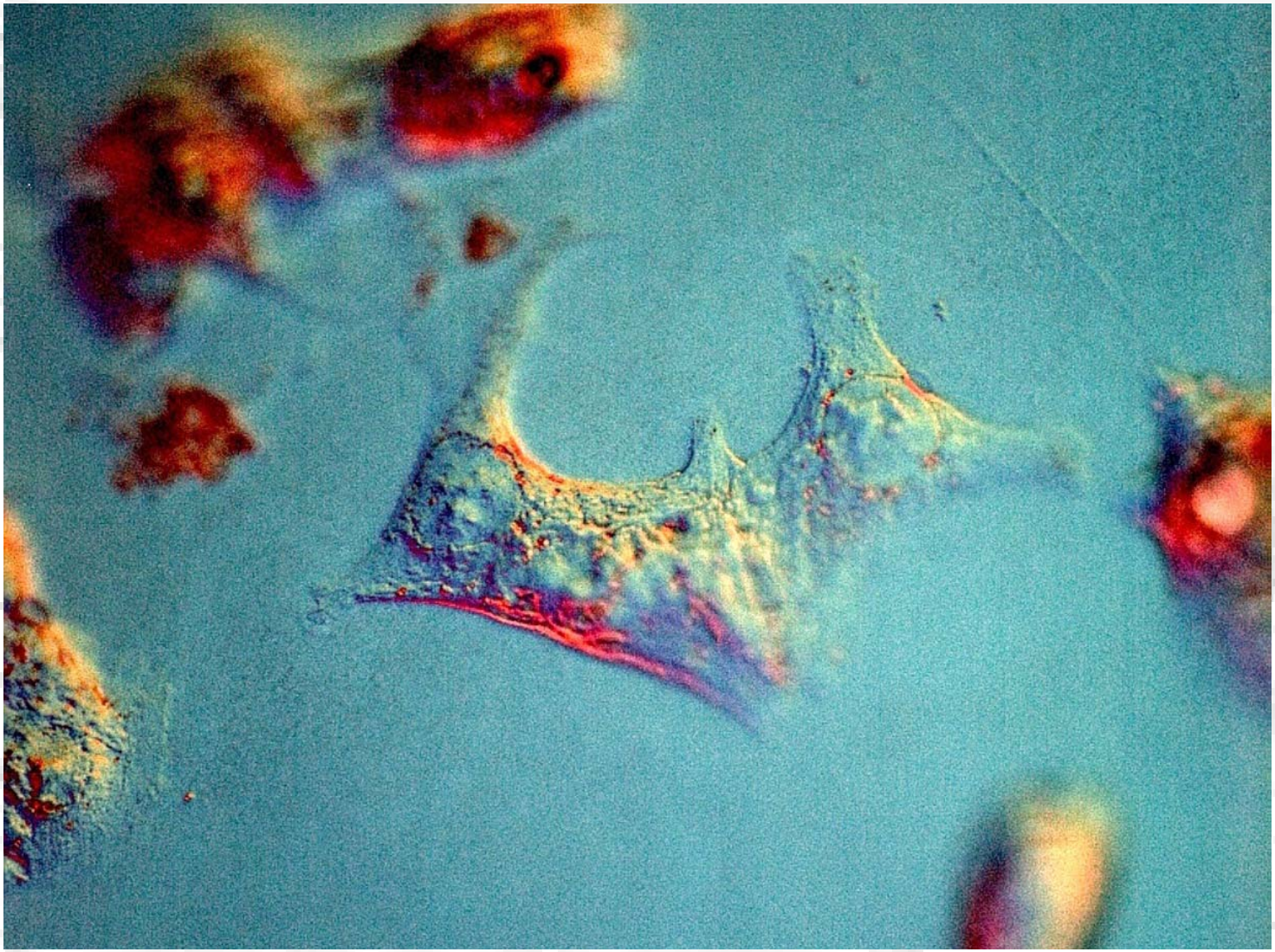
2011 EIPBN MicroGraph Contest



Micrograph Title:
Calling Batman – The ultimate immune response?

Description:

DIC microscopy image of a Bioimprint of *Ishikawa* endometrial cancer cells. Cells were cultured on glass slides and their shape replicated into a photosensitive methacrylate polymer via photo nanoimprint lithography.

Magnification (3"x4" image): 50 x

Submitted by: Volker Nock
Lynn Murray

Instrument (Make and Model): Nikon Eclipse 80i

Affiliation: The MacDiarmid Institute for Advanced Materials and Nanotechnology

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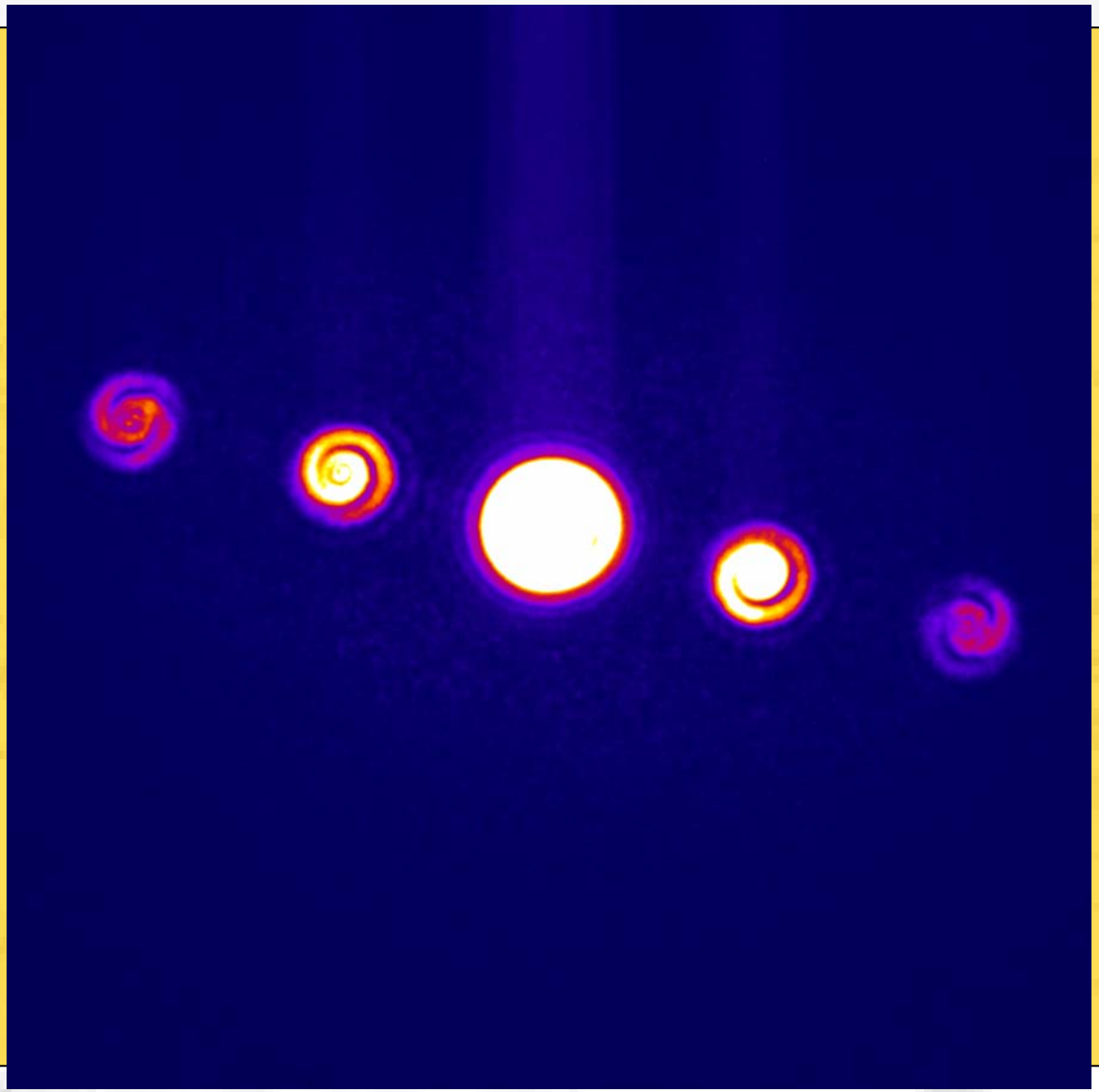
2011 EIPBN MicroGraph Contest

Micrograph Title: Spiral Electron Beams

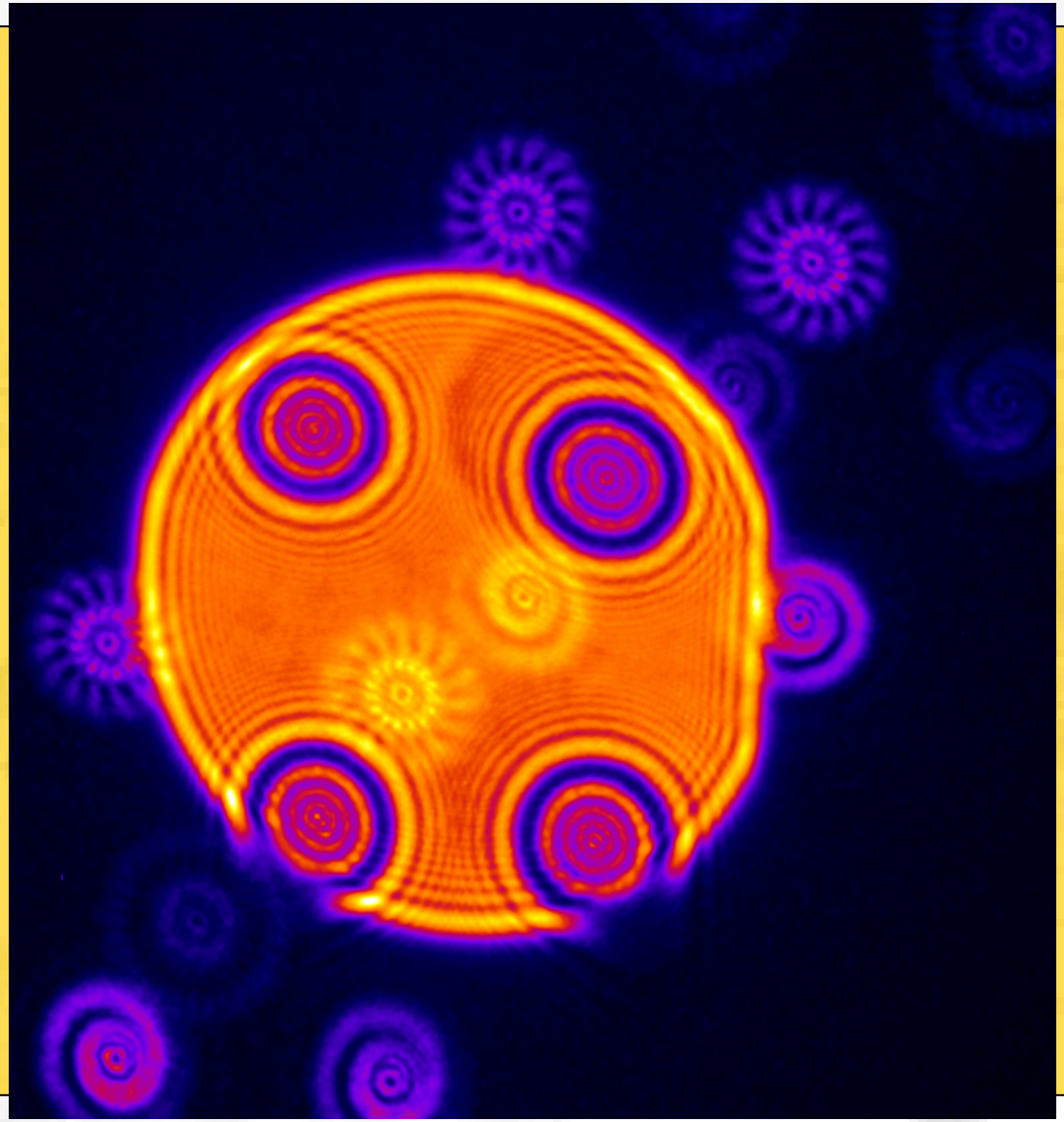
Description: Electron beams with helical wavefronts and orbital angular momentum are produced via diffraction from nanofabricated holograms.



Magnification (3"x4" image): N/A (about 4X) **Instrument (Make and Model): Philips/FEI CM300**

Submitted by: Benjamin McMorran **Affiliation: NIST**

2011 EIPBN MicroGraph Contest

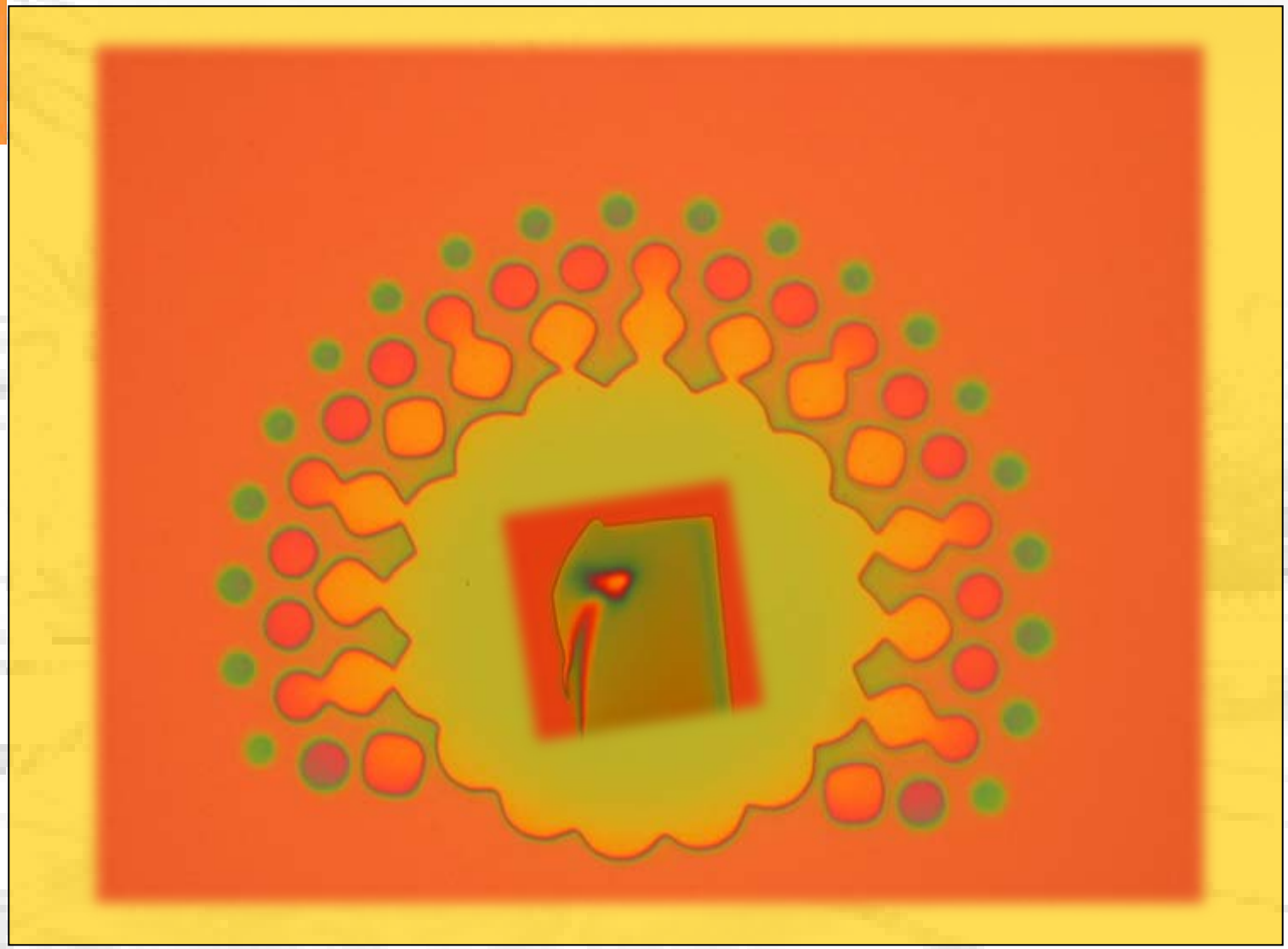


Micrograph Title:
Helices Electronica

Description:
Multiple electron beams with helical wavefronts and various amounts of quantized orbital angular momentum per electron, produced via diffraction from multiple nanofabricated holograms.

Magnification (3"x4" image): N/A (about 4X) **Instrument (Make and Model): Philips/FEI CM300**
Submitted by: Benjamin McMorran **Affiliation: NIST**

2011 EIPBN MicroGraph Contest



Micrograph Title:
Optical Peacock II

Description:
Patterns with various thicknesses etched in a SiN membrane through apertures in a compliant stencil membrane

Magnification (3"x4" image): x50
Submitted by: Veronica Savu

Instrument (Make and Model): Nikon Eclipse L200
Affiliation: EPFL

2011 EIPBN MicroGraph Contest

Micrograph Title: The Hula Dancer

Description: A color macrograph of a nano-metrology scientist in full ceremonial regalia

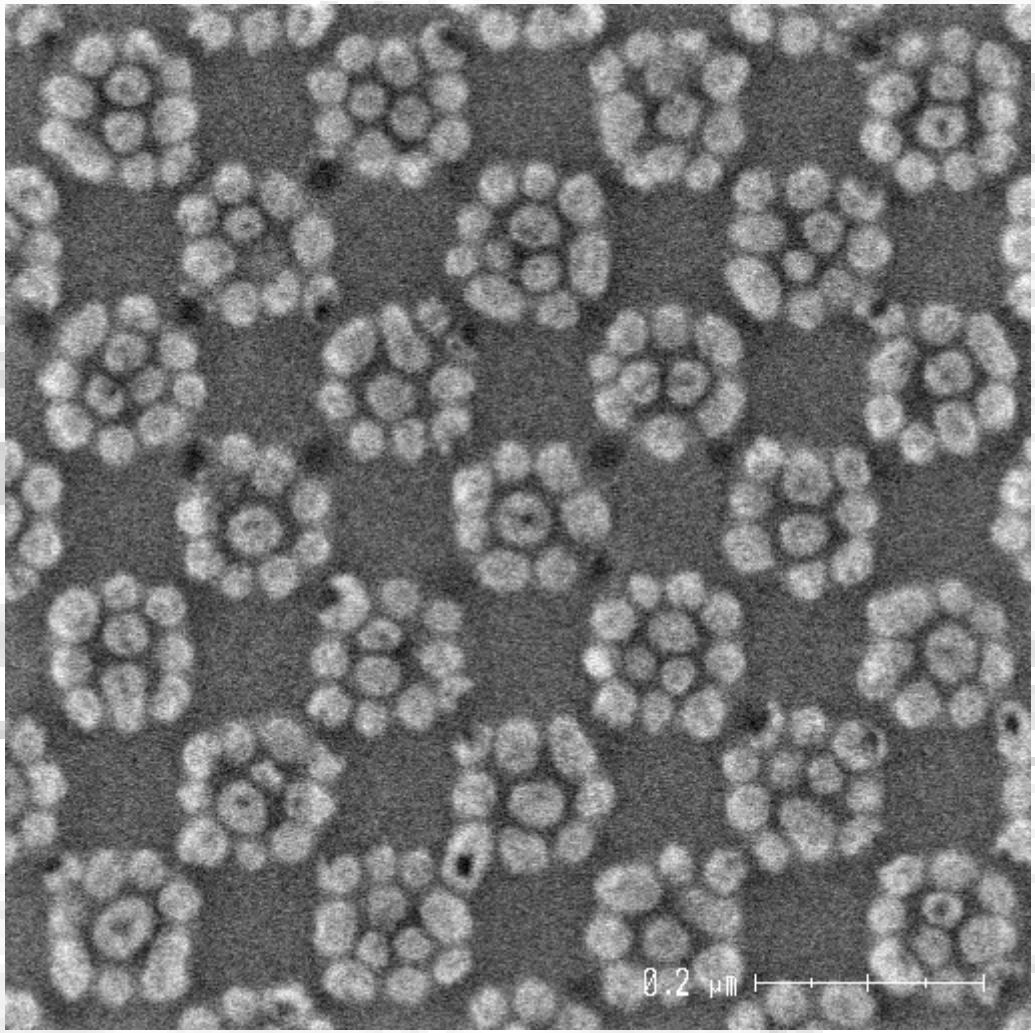
Magnification (3"x4" image): 0.048X
Submitted by: Steve Hickman

Instrument (Make and Model): Canon S3 IS
Affiliation: Harvard Center for Nanoscale Systems

2011 EIPBN MicroGraph Contest

Micrograph Title:
Flower Field in Full Bloom

Description:
Top-down views animation of Directed Self-Assembled (DSA) PDMS pillars in various diameter size hole pre-patterns formed by optical lithography.



Magnification (3"x4" image):X150,000
Submitted by: Y. Seino and T. Azuma

Instrument (Make and Model): SEM Hitachi CG4000
Affiliation: Toshiba Corp., Japan

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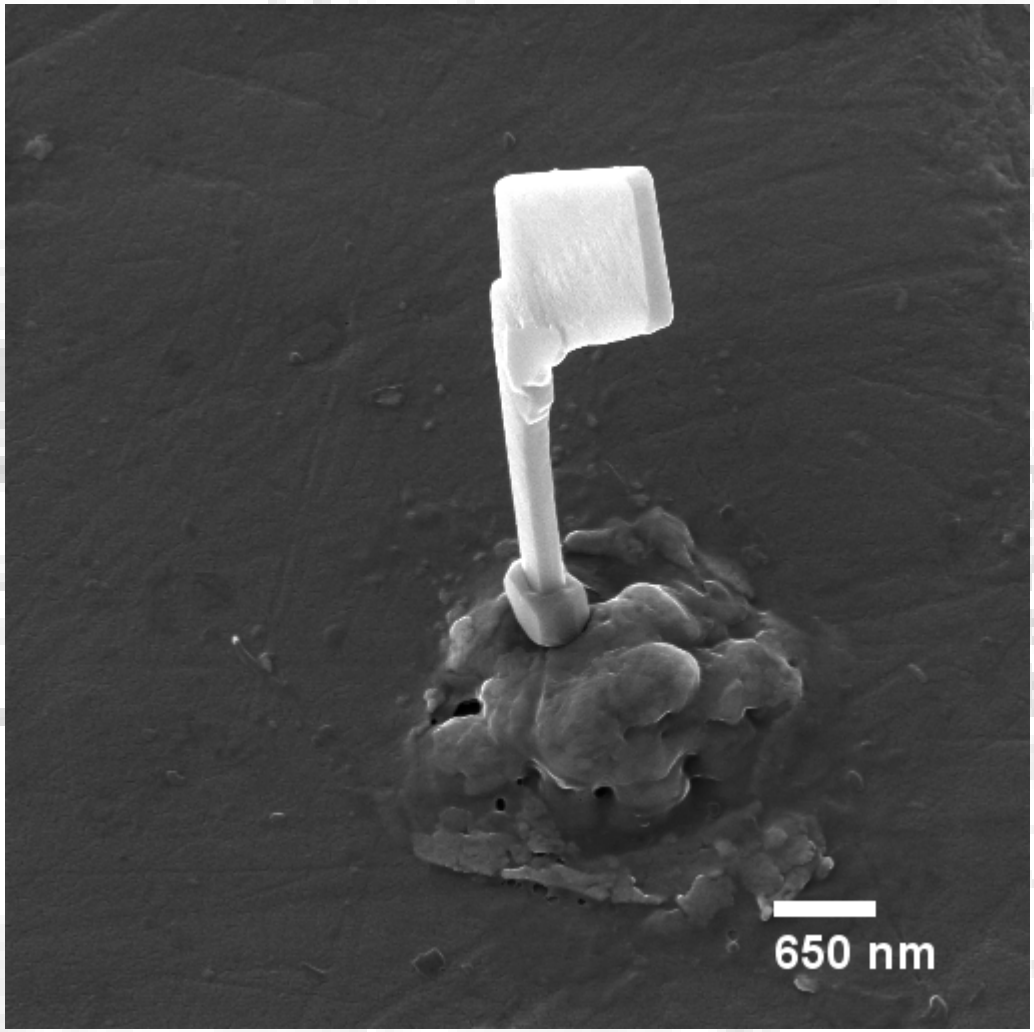
2011 EIPBN MicroGraph Contest

Micrograph Title:
I Claim This Defect for Mars!

Description:
A Mysterious object protruding from a defect in a metal film.



Magnification (3"x4" image): 18 kX
Submitted by: Larry Scipioni

Instrument (Make and Model): Carl Zeiss NTS, Orion Plus
Affiliation: Carl Zeiss NTS

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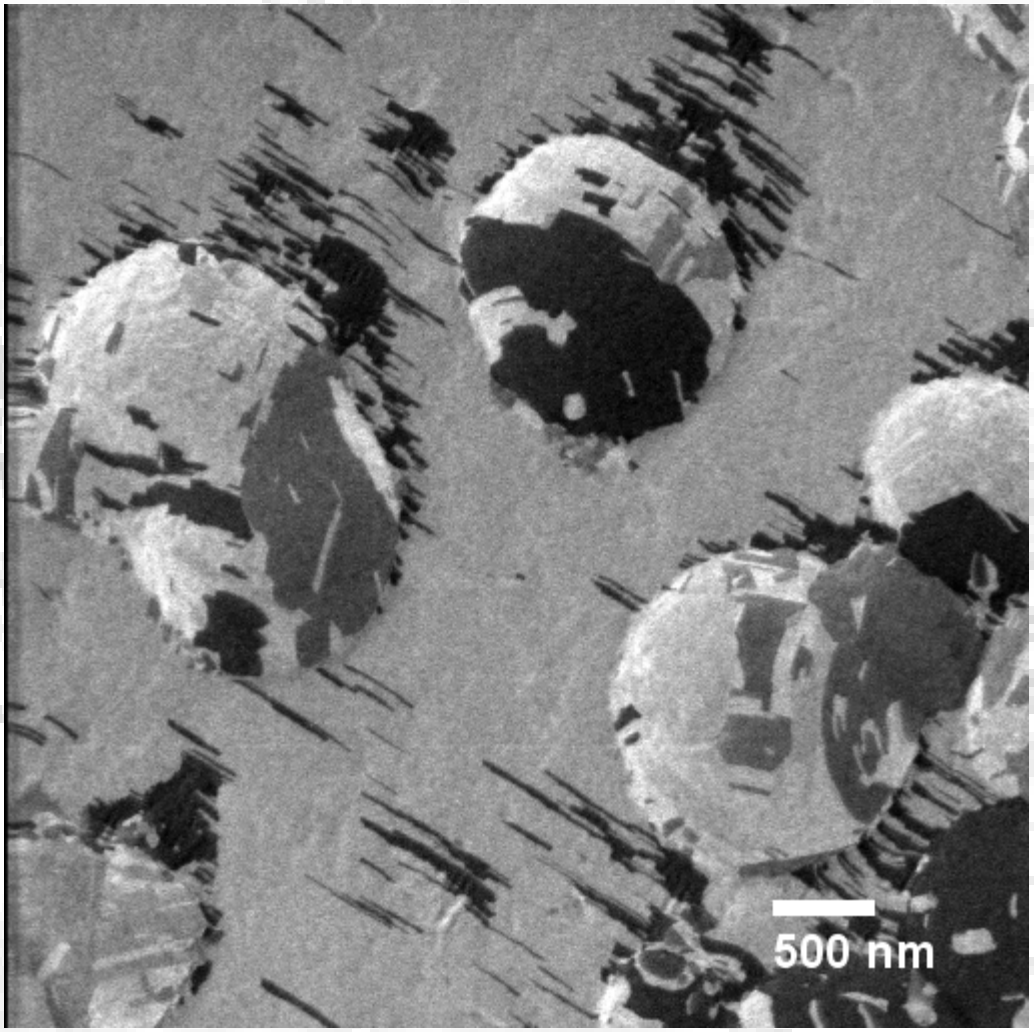
2011 EIPBN MicroGraph Contest

Micrograph Title: Kadinsky's Metallurgist Period

Description:
Polycrystalline gold surface, imaged with a neon ion beam



Magnification (3"x4" image): 23 kX
Submitted by: Larry Scipioni

Instrument (Make and Model): Carl Zeiss NTS, Orion Plus
Affiliation: Carl Zeiss NTS

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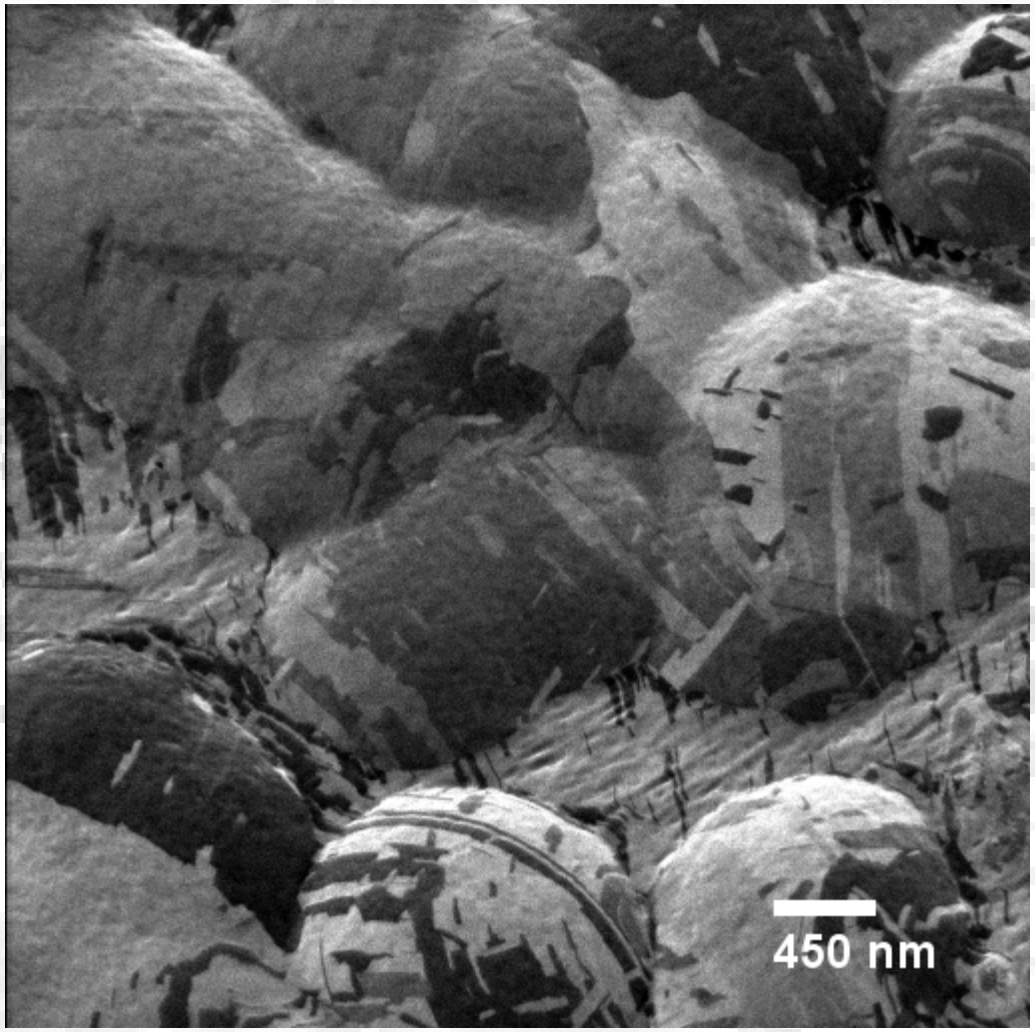
2011 EIPBN MicroGraph Contest

Micrograph Title:
There's Gold in Them There Hills!

Description:
Polycrystalline gold surface, imaged with a neon ion beam



Magnification (3"x4" image): 38 kX
Submitted by: Larry Scipioni

Instrument (Make and Model): Carl Zeiss NTS, Orion Plus
Affiliation: Carl Zeiss NTS

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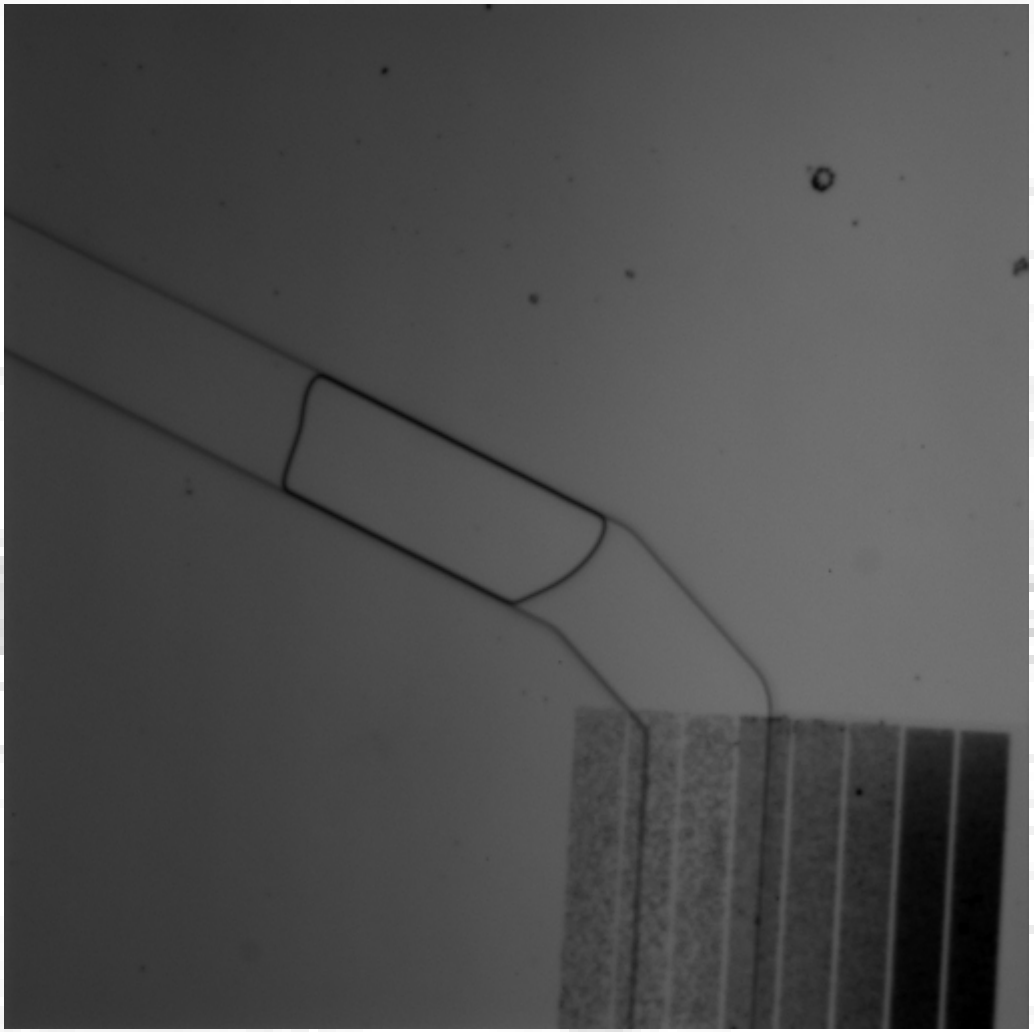
2011 EIPBN MicroGraph Contest

Ode to Michael

Description:
This is why you shouldn't play music while doing experiments with microfluidic channels



Magnification (3"x4" image): 20x
Submitted by: Irene Fernandez-Cuesta

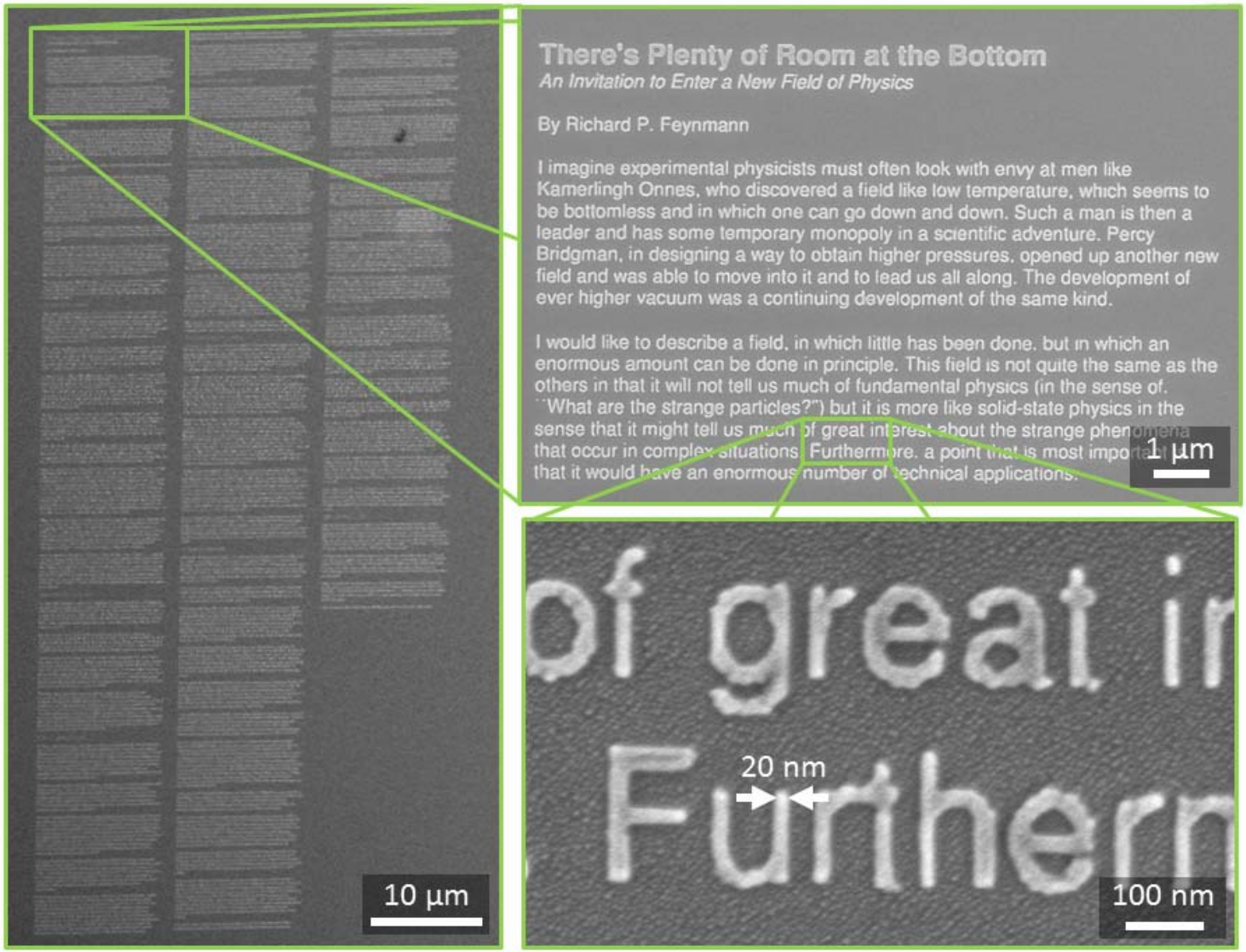
Instrument: Optical/Fluorescence Microscope (Nikon)
Affiliation: DTU Nanotech & The Molecular Foundry (LBNL)

2011 EIPBN MicroGraph Contest

Micrograph Title: There Actually Is Plenty of Room at the Bottom

Description: The full text of Feynmann's surprisingly prescient 1959 talk, written on an area about the size of an amoeba.

Material: 30 nm thick HSQ on Si



Magnification (3"x4" image): 1X, 10X, 100X

Submitted by: Bryan Cord

Instrument (Make and Model): JEOL 6700

Affiliation: University of Minnesota