

Lab on a Chip

Miniaturisation for chemistry, physics, biology, materials science and bioengineering

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Volume 13 | Number 8 | 21 April 2013 | Pages 1439–1650

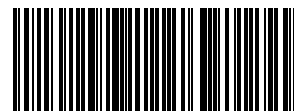


ISSN 1473-0197

RSC Publishing

FRONT COVER

The winner of the Art in Science Award presented at MicroTAS 2012



1473-0197 (2013) 13:8;1-Y

EDITORIAL

The Art in Science of microTAS

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DOI: 10.1039/c3lc90026f

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The 5th annual microTAS Art in Science Award was presented to Yi Zhang (Fig. 1), a graduate student from the Department of Biomedical Engineering of Johns Hopkins University, at the 16th International Conference on Miniaturized Systems for Chemistry and Life Sciences (microTAS) held in Okinawa, Japan, October 28 to November 1, 2012. The winning image, *Stretching the Rainbow* (Fig. 2), is featured on the front cover of this issue of *Lab on a Chip*.

The winning image depicts a tiny water droplet held in place by surface energy traps (SETs)¹ and stretched using a magnetic field to pull on magnetic particles within it. The device consisted of a glass cover slip coated with Teflon and patterned with the SETs. The device was placed on top of a DVD disc to



Fig. 2 The 2012 microTAS Art in Science Award winner: *Stretching the Rainbow*, submitted by Yi Zhang of the Department of Biomedical Engineering, Johns Hopkins University School of Medicine.

produce the brilliant rainbow colors. A white LED light source was brought to an angle that maximized the intensity of a diffraction pattern that reflected from the surface of the DVD. The magnet was positioned under the assembly and used to tug on the magnetic particles, which appear as a black plug in the droplet. The picture was taken using a consumer grade camera equipped with a high magnification lens.

The standard of submissions at the meeting was so high and the choice so difficult that we have taken the opportunity here to also feature three of the outstanding runners-up of this award as follows:

The *Microbrain*, submitted by Oliver Frey from ETH Zürich (Fig. 3).

Developing *Retina*, submitted by Samira Moorjani from the University of Washington (Fig. 4).

Beta Nova, submitted by Chae Yun Bae from KAIST (Fig. 5).

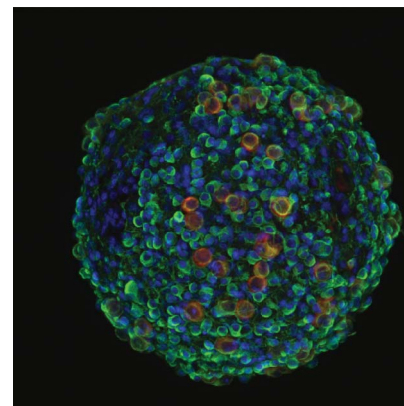


Fig. 3 Award finalist: *The Microbrain*, submitted by Oliver Frey, ETH Zürich. Spherical microtissue formed in a hanging drop; cultured, stained and imaged in a microfluidic perfusion channel. Laser-scanning confocal micrograph (blue = Hoechst 33342, green = α -tubulin, red = MAP2).

What makes a winning submission?

The microTAS Art in Science Award was established to “draw attention to the aesthetic value in scientific illustrations while still conveying scientific merit”. This year, the award committee chose to limit the submissions to:

- Work presented at the conference.
- Graduate students or post docs.

A large number of high quality submissions had to be carefully considered. The committee began the selection process by scoring the submissions with following the criteria:

- Visual appeal.
- Originality of the idea or image.
- Scientific appeal.



Fig. 1 Yi Zhang of Johns Hopkins University (center) receives the 5th Annual microTAS Art in Science Award, presented by Michael Gaitan of NIST (left) and Harpal Minhas of LOC/RSC (right).

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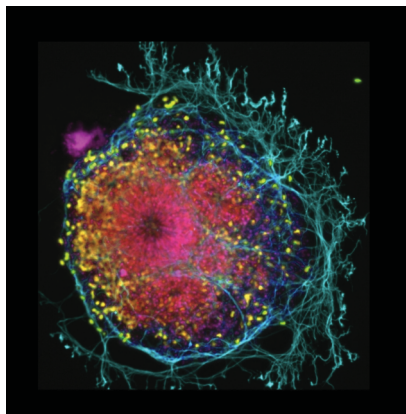


Fig. 4 Award finalist: Developing Retina, submitted by Samira Moorjani from the University of Washington. An immunostained retinal explant from an embryonic mouse after seven days in culture.

- Simplicity in complexity.
- Color.
- Suitability as a cover image for LOC.

One issue that came up concerned the resolution of the image presented. Was a submission of high enough resolution that it could be published as submitted on the cover of Lab on a Chip? Would it be fair to contact the submitter to see if an image was available in higher resolution? The consensus of the award committee was that the images should be judged on the basis of what was received. Thus, the submission of a high-resolution image became important in the last stages of the selection process.

The ability for an image or artwork to inspire is not straightforward to define. To paraphrase what we wrote in the

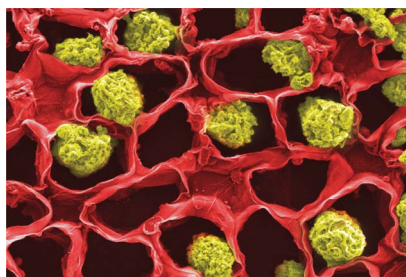


Fig. 5 Award finalist: Beta Nova, submitted by Chae Yun Bae from KAIST. A modified SEM image with pseudo colors. Yellow represents clusters of pancreatic beta cell insulinomas and red represents a hydrogel scaffold.

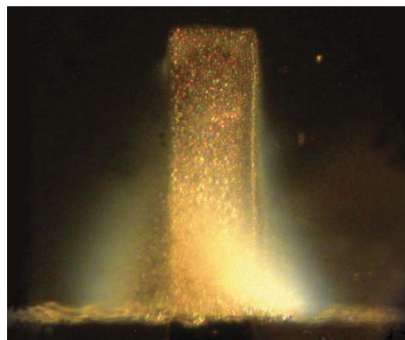


Fig. 6 Art in Science 2008 award winner: City Lights by Yu-Wen Huang. The image is a micrograph of a solution of unlabelled double-stranded DNA, electrophoretically concentrated near a 50 mm-wide electrode.

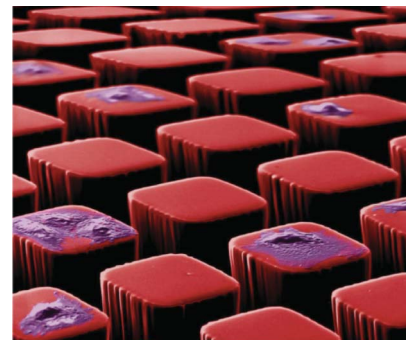


Fig. 8 Art in Science 2010 award winner: Cell Block 9 by Nicolas Gunn. A colorized SEM micrograph showing fibroblast cells cultured on microscale pedestals.

2010 Art in Science editorial:² *the discovery of a natural phenomenon unveils a curtain of ignorance from what has always existed. However, the creation of art requires the use of materials and knowledge combined with artistic inspiration to create a work of aesthetic appeal. By this definition, aesthetics in technology do not exist by accident they exist by artistic inspiration.*

Fig. 6–9 are past award winners that are included here to exemplify the concept of the use of knowledge, microTAS technology, and artistic inspiration to create a winning image. Prospective award winners: please take note.

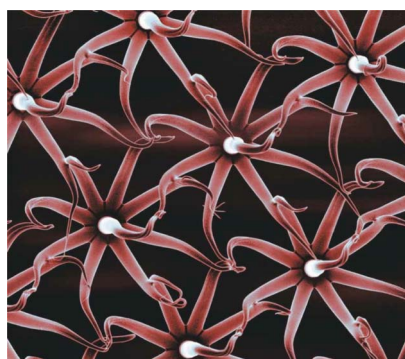


Fig. 7 Art in Science 2009 award winner: Micro world: united we stand by Jungkwun Kim and Yong Kyu Yoon. SU-8 shapes defined by multi-directional ultraviolet lithography, where glass with a pre-patterned chromium layer is used as a photomask as well as a substrate.

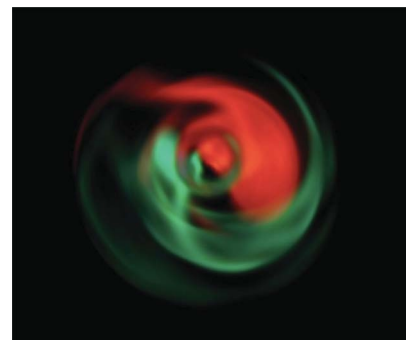


Fig. 9 Art in Science 2011 award winner: Yin and Yang in a Droplet by Dong Jin Shin. A snapshot of the mixing of two types of quantum dot solutions inside a sessile droplet driven by a microfluidic magnetic gyromixer.

References

- 1 Y. Zhang and T.-H. Wang, Droplet Immobilization, Splitting, Metering and Aliquoting with Surface Energy Traps Created Using SU8 Shadow Mask, *Proceedings MicroTAS 2012*, Oct 28–Nov 1, 2012, Okinawa, Japan, p. 73–75.
- 2 M. Gaitan and L. Locascio, Art in Science, Editorial, *Lab Chip*, 2011, **11**, 993–994.