

### 2019 *Microscopy Today* Micrograph Awards

The inaugural *Microscopy Today* Micrograph Awards competition was a great success. The premise of the competition was that scientific micrographs can be interesting in their own right as images with visual impact. Submissions to the competition came from 24 US states and 16 other countries. The 25 finalist images were shown on the cover of the July issue. In this article we show the first, second, and third prize winners in each category: **Published category**, for micrographs published in the previous year; **Open category**, for unpublished micrographs; and **Video category**, for clips of movies taken through a microscope and animations of reconstructed images. The winner of the People's Choice Award is shown on the cover of this issue. Finalists and prize winners were selected by senior editors and our Celebrity Judge; whereas, the People's Choice Award was selected via public voting at the competition gallery on the MSA website.

Our Celebrity Judge this year was David Scharf. Scharf is a world-renowned photographer who employs the scanning electron microscope (SEM) as his camera. He pioneered techniques for capturing images of uncoated specimens of hydrated insects and flora in a high-vacuum SEM [1]. Some of

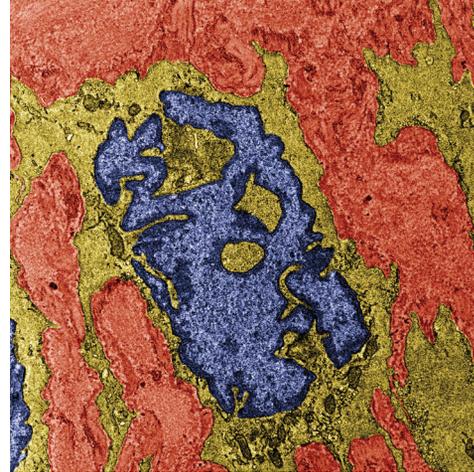
his earliest images were published in *Newsweek* in 1975, only ten years after the introduction of the commercial SEM [2]. In 1976 his images were displayed in a one-man show at the National Academy of Sciences in Washington, DC [3]. A year later he published a book of his micrographs titled *Magnifications: Photography with the Scanning Electron Microscope* [4]. Since then Scharf's micrographs have appeared in many publications including *Time*, *National Geographic*, *Smithsonian*, *Discover*, *Science*, *Nature*, and *The New York Times*. His movies of insects have even appeared in an IMAX production.

The *Microscopy Today* Micrograph Awards competition grew out of an idea by Robert and Camille Simmons. They suggested in 2017 that *Microscopy Today* sponsor a micrograph contest emphasizing both the scientific and artistic merit of micrographs. This concept was developed during 2018 into a set of guidelines for determining what constitutes a winning micrograph. In short, after the scientific relevance of an image has been established, the primary criterion for a winning image in our competition is visual impact—could the image stand on its own as a captivating object without requiring knowledge of the subject. In other words, would it look good on a living room or museum wall.

#### Published Category



**Published 1st Prize.** Copepod with epibiontic growth of microalgae living in symbiosis. Focus stacking in dark-field light microscopy using a thick water mount. Published in *Chiiz* photography magazine #17, 2018, 66–69. Image by Håkan Kvarnström, Bromma, Sweden.

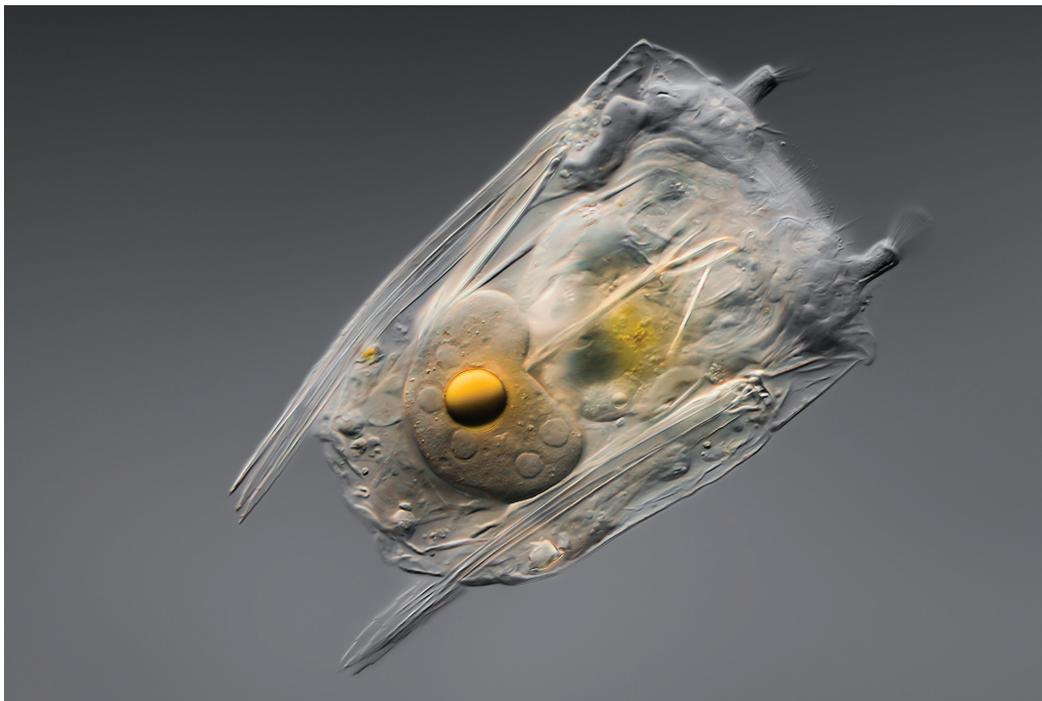


**Published 2nd Prize.** (left) *Artemia franciscana* (brine shrimp) at 35 days of growth. Specimen taken from a school lab experiment. Dark-field light microscopy. Published in *Microscopy Today* 26(4) 2018, 12–17. Image by Timm Piper, Laboratory for Applied Microscopy Research, Embrach, Switzerland. **Published 3rd Prize.** (right) False-colored transmission electron micrograph of an aortic smooth muscle cell from a mouse with progeria. Progeria is a rare genetic disorder caused by a mutation that results in the production of a mutant form of prelamin A called progerin. This results in nuclear envelopes that are unstable and susceptible to mechanical stress. The nucleus (shown in blue) is severely deformed with large invaginations and tubules throughout. Cytoplasm is colored yellow; extracellular matrix is red. Published on the cover of *Science Translational Medicine*, 10 (Sept 26) 2018. Image by Thomas Weston, University of California Los Angeles, Los Angeles, CA.

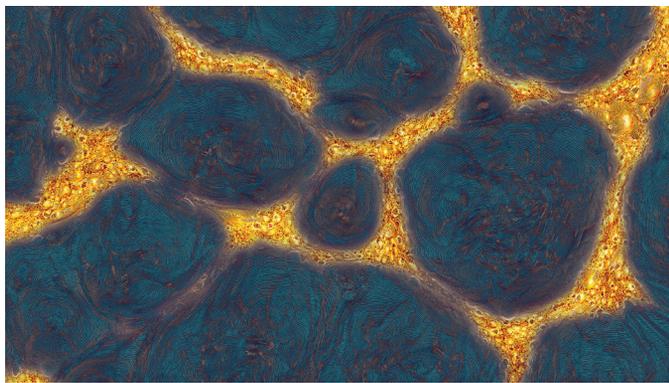
Another goal for our competition is to honor images that may not be eligible or competitive in other micrograph contests. First, all types of micrographs are welcome in this competition, whether they were acquired with a light microscope, electron microscope, scanning probe microscope, or some other microanalytical instrument. Second, some worthy micrographs are published in journals or magazines without a thought of entering them in a competition. By honoring

such images in a separate category, we hope to encourage microscopists to think more about composition and visual impact in experiment planning and during image acquisition. Third, the understanding of mechanisms and processes often requires dynamic imaging acquired with *in situ* microscopes of all types. Also, digital animations of reconstructed three-dimensional datasets, for example from cryo-electron microscopy, are providing new insights into cellular and even

### Open Category



**Open 1st Prize.** Rotifer *Polyarthra* sp. (150  $\mu\text{m}$  long) showing heart-shaped ovary with nuclei and yolk. Focus stacking with light microscopy in differential interference contrast (DIC). Image by Håkan Kvarnström, Bromma, Sweden.



**Open 2nd Prize.** Solid electrolyte composed of two polymers for a lithium-metal battery. Polymers self-assembled into an ordered lamellar structure (blue). An added lithium salt increases the ionic conductivity but also causes structurally disordered regions (yellow). Scanning electron microscopy image acquired at 2 kV. Image by Alexander Mueller, National Center for Electron Microscopy, Berkeley, CA.



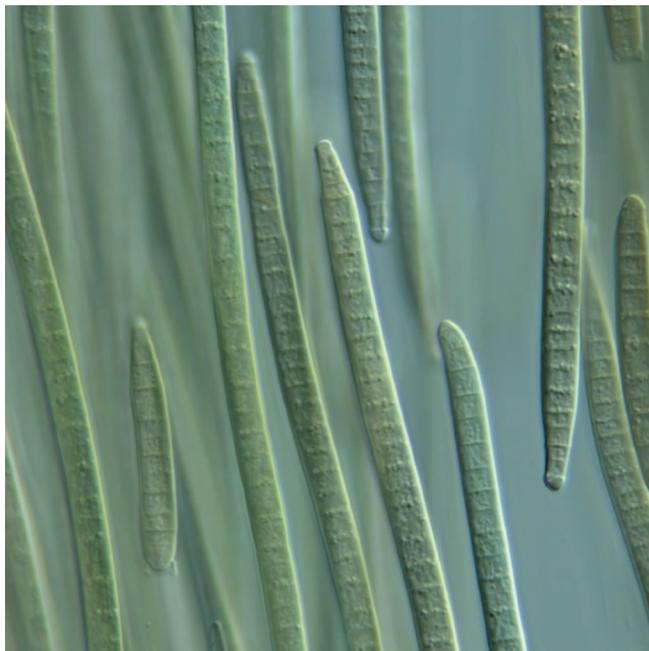
**Open 3rd Prize.** Head of wasp (*Vespa* sp.), from a genus of social wasps that are widely distributed in the Northern Hemisphere. Focus stacking in reflected visible light micrograph. Autofluorescence of eyes is evident when also illuminated with UV light. Image by Sergii Dymchenko, SDym Photography, Bellevue, WA.

molecular structures. These movie micrographs constitute our third category: video/streaming micrographs.

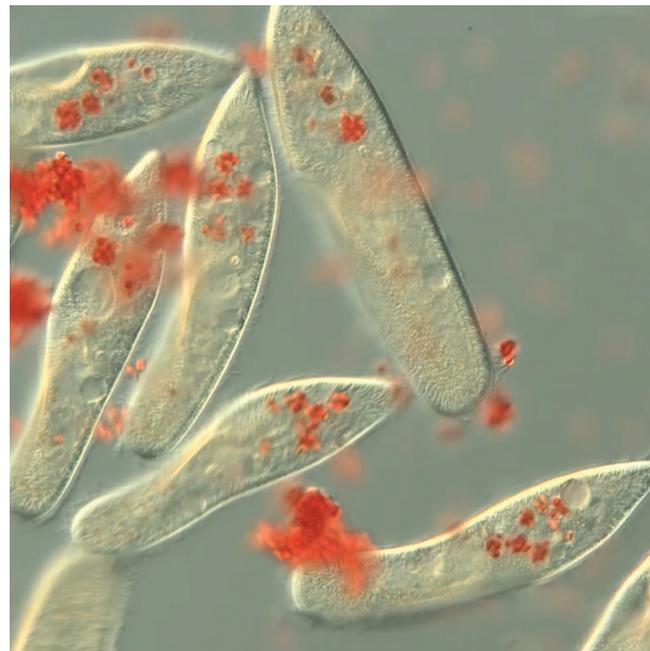
Another consideration in our competition is image quality from a technical standpoint. Image focus is important. With focus stacking software, light micrographs now can be in sharp focus over a considerable depth of field. Lack of image sharpness, and other image defects, is revealed when our judges view submitted images on high-resolution monitors. We request that submitted images have a high enough pixel density to be presented in an 11"×14" format suitable for hanging in an

exhibition. This is much easier today since the cost of high-pixel-resolution cameras has decreased dramatically over the last decade. An image with only a modest pixel density is not shut out of the competition, but a justification is required to allow the micrograph to be competitive. Nestor Zaluzec created and implemented a cloud-based submission website that not only allows large digital images to be uploaded, but also has convenient features to help judges compare and evaluate images.

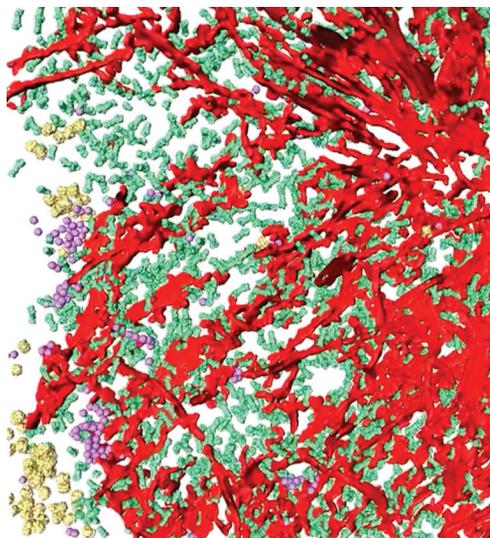
## Video Category



**Video 1st Prize.** Still image of *Oscillatoria* sp. cyanobacteria filaments moving with respect to one another. Light microscopy filmed in time lapse with differential interference contrast (DIC). Image by Gerd Günther, Düsseldorf, Germany. The video is available at: <https://doi.org/10.1017/S1551929519000853>.



**Video 2nd Prize.** Still image of *Paramecium caudatum* ciliates, fed with Congo red stained yeast to show digestion within the unicellular animal. Light microscopy in differential interference contrast (DIC). Image by Gerd Günther, Düsseldorf, Germany. The video is available at: <https://doi.org/10.1017/S1551929519000853>.



**Video 3rd Prize.** Still image of tomographic volume and 3D rendering of the neuronal polyGA aggregate inside a cell. Poly-GA ribbons (red), 26S proteasomes (green), ribosomes (yellow), TRiC/CCT chaperonins (purple). Rat neurons were cultured on EM grids and thinned within a cryo-FIB. Tomographic tilt series acquired in a cryo-TEM. Image by Qiang Guo, Max Planck Institute of Biochemistry, Planegg, Germany. The video is available at: <https://doi.org/10.1017/S1551929519000853>.

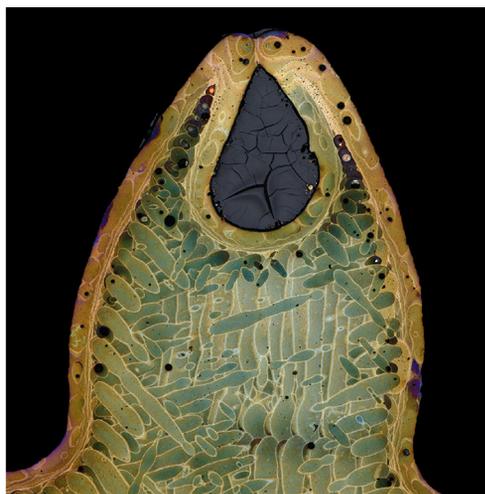


**People's Choice Award.** Carbon-free martensite, formed by casting a CoFeSi alloy into a copper mold. Several generations of martensite needles are clearly distinguishable, and the former austenite grains can be identified. Metallographic specimen etched with color etching agent V2A-Beize and imaged in reflected light microscope. Image by Felix Trauter, Materials Research Institute, Aalen University, Aalen, Germany.

These prizes were presented at a ceremony on August 7 during the 2019 M&M meeting in Portland, OR. The success of this first *Microscopy Today* Micrograph Awards competition is evident in the strong group of finalists and prize winners.

The editors of *Microscopy Today* thank the all entrants into this year's competition and welcome submissions to the next competition. The submission website will re-open on October 1, 2019, and close on February 21, 2020.

## Special Honors



**Special Award for Metallography.** Gearwheel of AISi10Mg made by additive manufacturing (selective laser melting, laser bed fusion) (left). Cross section (right) shows microstructure with solidification structure and laser traces. Metallographic preparation, color etching with Murakami's reagent, bright-field light microscopy. Image by Gaby Ketzer-Raichle, Materials Research Institute, Aalen University, Aalen, Germany.

## References

- [1] D Scharf, *Microscopy Today* 25(1) (2017) 12–15.
- [2] "Small Wonders of a Magic Eye – Images of D. Scharf," *Newsweek*, March 3, 1975, 52–53.

- [3] D Scharf, "A Closer Look," one-man exhibition at the National Academy of Sciences, November 17, 1975 to January 31, 1976.
- [4] D Scharf, *Magnifications: Photography with the Scanning Electron Microscope*, Schocken Books, New York, 1977.

MT

Organized storage and transport for Cryo-EM specimen grids under cryogenic conditions

# NEW: EMS Cryo Pucks G2



We are now offering a broad selection of kits and bundles to meet your needs.

- 12 wells per puck for Cryo Grid Boxes
- Each puck has a unique alpha-numeric code for easy identification
- Indexed wells for sample tracking
- Holds round Cryo Grid Boxes
- Puck depth accommodates pin type lid style Cryo Grid Boxes
- When using Cryo Grid Boxes with flat-style lids, you can store up to 24 Cryo Grid Boxes per puck
- Special tweezer slots allow easy and secure removal of Cryo Grid Boxes
- Shelved shipping Cane holds up to 8 pucks
- Shelved Storage Cane hold 10 packs
- Magnets for strong puck retention but easy removal
- 2D Barcoding and custom puck serialization for advanced sample tracking
- See-through, affixed lid retains liquid nitrogen during transfers to protect samples
- Lid-lock feature provides easy and secure loading
- 10 Unique puck colors available for easy identification (available upon request)



2D Barcoding and custom puck serialization for advanced sample tracking

Limiting exposure to ambient conditions is recommended, but brief periods during puck placement and retrieval has not resulted in frost or ice accumulation. Contact us for ordering pucks in a specific color combination. Available colors include: Red, Blue, Purple, Grey, Black, Gold, Green, Violet, Brown, Orange.

## Electron Microscopy Sciences

P.O. Box 550 • 1560 Industry Rd.  
Hatfield, Pa 19440  
Tel: (215) 412-8400  
Fax: (215) 412-8450  
email: [info@emsdiasum.com](mailto:info@emsdiasum.com)  
or [stacie@ems-secure.com](mailto:stacie@ems-secure.com)

OUR MAIN INTERACTIVE WEBSITE:  
[www.emsdiasum.com](http://www.emsdiasum.com)

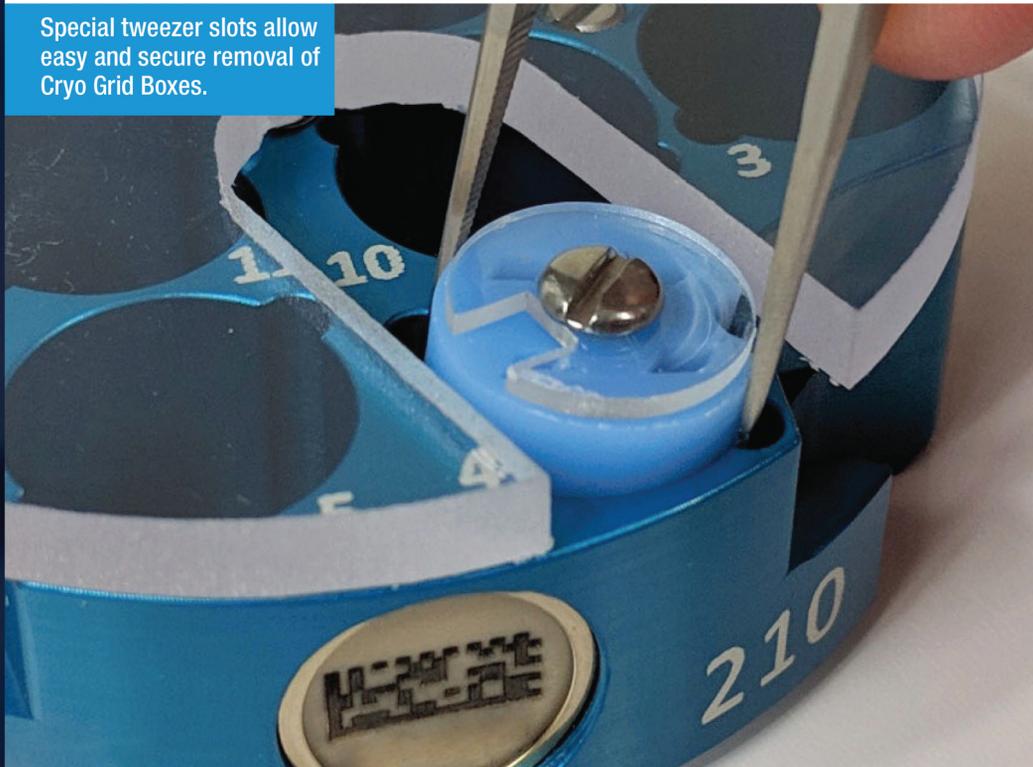
 TO REQUEST A COPY OF OUR CATALOG:  
[www.emsdiasum.com/requests/catalog](http://www.emsdiasum.com/requests/catalog)

 TO VIEW OUR DIGITAL CATALOG:  
[catalog.emsdiasum.com](http://catalog.emsdiasum.com)

 ...OR SCAN HERE:



Special tweezer slots allow easy and secure removal of Cryo Grid Boxes.



# EMS Cryo Puck Sets G2 & Accessories

## Ordering Information

### EMS Cryo Pucks G2 Basic Starter Set

**Includes:**

- (10) G2 EMS Cryo Pucks
- (1) Shelved Storage Cane
- (1) Shelved Puck Shipping Cane
- (1) Angled Cryo-Tongs

Cat. No.	Description	Qty.
71168-00	1-color	set
71168-03	rainbow	set

### EMS Cryo Pucks G2 Advanced Starter Set

**Includes:**

- (10) G2 EMS Cryo Pucks
- (1) Shelved Puck Shipping Cane
- (1) Shelved Storage Cane
- (1) Angled Cryo-Tongs
- (1) Grasping Tongs
- (1) Puck Dewar and Insert
- (1) Cryo-EM Grid Box Tweezers
- (1) Screwdriver for Lid Lock
- (1) Puck & Cane Tracking Log Book

Cat. No.	Description	Qty.
71168-04	1-color	set
71168-05	rainbow	set

### EMS Cryo Pucks G2 Facility HC34/VHC35 Starter Set

**Includes:**

- (60) G2 EMS Cryo Pucks
- (1) Shelved Puck Shipping Cane
- (6) Shelved Storage Canes
- (1) Angled Cryo-Tongs
- (1) Grasping Tongs
- (1) Puck Dewar and Insert
- (1) Cryo-EM Grid Box Tweezers
- (1) Screwdriver for Lid Lock
- (1) Puck & Cane Tracking Log Book
- (1) Barcode Reader

Cat. No.	Description	Qty.
71168-06	1-color	set
71168-14	rainbow	set

### EMS Cryo Pucks G2 Facility HC34/VHC35 Advanced Set

**Includes:**

- (60) G2 EMS Cryo Pucks
- (1) Shelved Puck Shipping Cane
- (6) Shelved Storage Canes
- (2) Angled Cryo-Tongs
- (2) Grasping Tongs
- (2) Puck Dewar and Insert
- (2) Cryo-EM Grid Box Tweezers
- (2) Screwdriver for Lid Lock
- (2) Puck & Cane Tracking Log Book
- (1) Barcode Reader
- (1) HC34 Dewar & Roller Base
- (1) CX100 Dryshipper and Case

Cat. No.	Description	Qty.
71168-15	1-color	set
71168-16	rainbow	set

### EMS Cryo Pucks G2 Facility HC35 Starter Set

**Includes:**

- (100) G2 EMS Cryo Pucks
- (1) Shelved Puck Shipping Cane
- (10) Shelved Storage Canes
- (1) Angled Cryo-Tongs
- (1) Grasping Tongs
- (1) Puck Dewar and Insert
- (1) Cryo-EM Grid Box Tweezers
- (1) Screwdriver for Lid Lock
- (1) Puck & Cane Tracking Log Book
- (1) Barcode Reader

Cat. No.	Description	Qty.
71168-17	1-color	set
71168-18	rainbow	set

### EMS Cryo Pucks G2 Facility HC35 Advanced Set

**Includes:**

- (100) G2 EMS Cryo Pucks
- (1) Shelved Puck Shipping Cane
- (10) Shelved Storage Canes
- (2) Angled Cryo-Tongs
- (2) Grasping Tongs
- (2) Puck Dewar and Insert
- (2) Cryo-EM Grid Box Tweezers
- (2) Screwdriver for Lid Lock
- (2) Puck & Cane Tracking Log Book
- (1) Barcode Reader
- (1) HC35 Dewar & Roller Base
- (1) CX100 Dryshipper and Case

Cat. No.	Description	Qty.
71168-19	1-color	set
71168-20	rainbow	set

### Cryo Pucks and Canes

Cat. No.	Description	Qty.
71168-21	EMS Cryo Pucks G2	each
71168-22	EMS Cryo Pucks G2	10/pk
71168-25	EM Puck Grasping Tongs G2	each
71168-09	G2 Shelved Storage Cane - HC34/VHC35	each
71168-27	G2 Shelved Storage Cane - HC35	each
71168-28	G2 Shelved Storage Cane - Custom	each
71168-12	G2 Shelved Puck Shipping Cane - CX100	each
71168-11	Bent Cryo Tong	each



71168-11



71168-25



71168-38



71168-13



71168-42

### Cryo Equipment

71168-13	Cryo Express Dry Shipper with Case	each
71168-32	HC34 34 liter High-Capacity Refrigerator	each
71168-33	HC35 35 liter High-Capacity Refrigerator	each
71168-34	VHC35 Very High Capacity Refrigerator w/ Canisters (Holds up to 6 Puck Storage Canes)	each
71168-35	Roller Base for HC34, HC35 & VHC35	each

### Cryo Puck Accessories

71168-08	EMS Cryo Puck Storage Case	each
71168-10	Double Puck Loading Dewar with Lid	each
71168-38	Dewar Insert	each
71168-39	Tweezers	each
71168-40	Lid Lock Screwdriver	each
71168-41	Puck and Cane Log Sheets	each
71168-42	Barcode Reader	each

### Remaining EMS Cryo Pucks G1

While supplies last...

71168-02	EMS Cryo Pucks G1	each
71168-07	EMS Cryo Pucks G1	7/pk