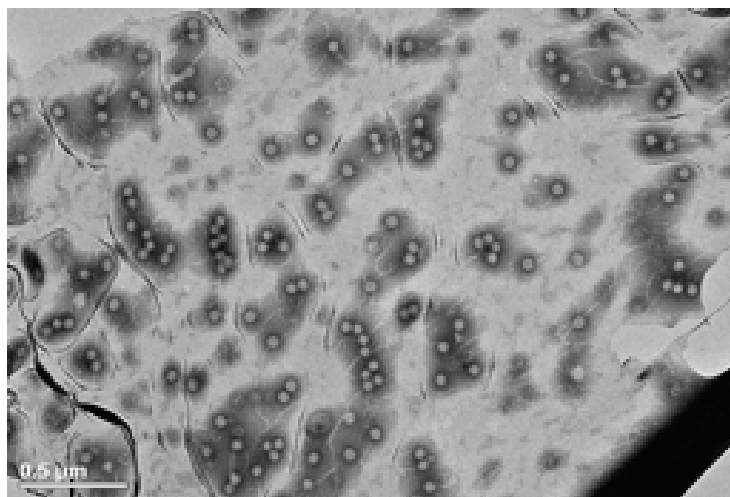


TEM Imaging of Bacteriophages

Karthik Chinnathambi, Ph.D., Boise State Center for Materials

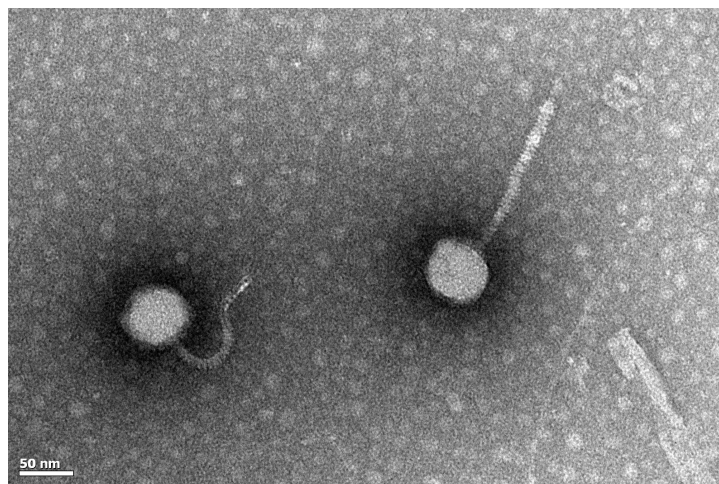
Bacteriophages (viruses that infect bacteria) represent the most prevalent biological forms on earth.



This low magnification bright-field TEM micrograph shows the presence of many bacteriophages. The darker regions correspond to stain.

Like any other biological sample, the image contrast of these viruses is poor under the electron microscope, making it difficult to identify their structural and morphological features and necessitating the use of contrast enhancing techniques such as staining. Negative staining is one such technique in which the sample is coated with chemicals containing heavy metals such as phosphotungstic acid, uranyl acetate, etc. During imaging, the beam interacts more strongly with the stain, which covers the outside of the viruses, than the other regions which contain less stain, resulting in a contrast.

Bacteriophages were obtained from soil samples collected primarily in the Treasure Valley of Idaho. They were further grown in the lab using the bacterial host *Mycobacterium Smegmatis*, a soil bacterium. The enriched samples were then filtered and isolated. The samples were prepared for electron microscopy using the negative staining method in which 1- 2 mL of the sample and about 20 mL of 2% phosphotungstic acid stain were dripped on a carbon coated TEM grid. The samples were then allowed to air dry before loading in the TEM holder. Electron imaging was done using a JEOL JEM-2100 HR TEM operated at 120 kV.



High magnification bright-field TEM micrograph of a couple bacteriophages classified as siphoviridae morphotypes (bacteriophages with head and tail).

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Boise State Center for Materials Characterization

Dr. Rick Ubic
Director
rickubic@boisestate.edu
(208) 426-2309
MEC 403K

Dr. Karthik Chinnathambi
Research Engineer
karthikchinnathambi@boisestate.edu
(208) 426-4646
MEC 112

Dr. Nick Bulloss
Research Engineer
nicholasbulloss@boisestate.edu
(208) 426-5711 OR (208) 426-5365
MEC 112 & MEC 105A