

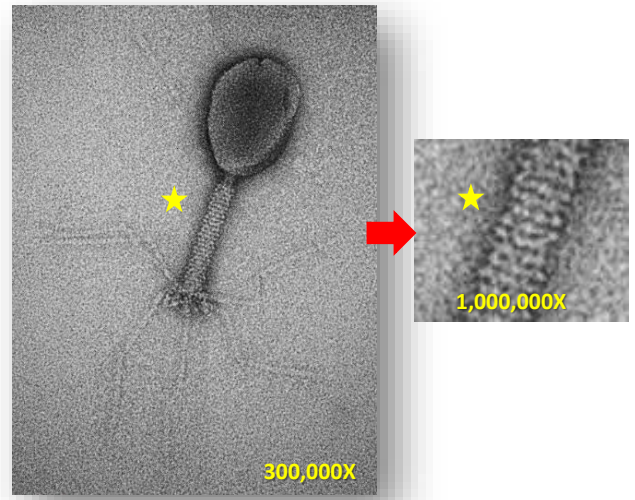
Biology 498/01: Spring 2022 TEM Workshop, 1 cr.

"Using Transmission Electron Microscopy to Image Viruses and Bacteria"

In-person sessions: 18-20 February 2022



UWSP's Hitachi H-7500 Transmission Electron Microscope



A T2 bacteriophage, ready to inject its viral DNA into its bacterial host, *E. coli*. The tiny dots around the tail sheath ("*") are actually individual proteins!

Description: Our Hitachi H-7500 transmission electron microscope (TEM) can create clear images at over **600,000X** magnification -- more than **400 times higher** than the best light microscope. TEM's are used to look at individual molecular structures in bacteria and viruses (like Covid2). In this Workshop, students will have the rare opportunity to learn how to operate a TEM and its digital camera system. Students will look at viruses and bacteria that they will prepare themselves by a rapid technique called **negative staining**. There will also be sections of plant or animal tissues prepared by the instructor. Following training sessions, the class will break up into individual tutorials to practice their TEM and camera skills on their own preparations. After this Workshop, students will have the option of using their training to pursue research projects with other Biology faculty members.

Instructor: Sol Sepsenwol, Ph.D., Emeritus Professor of Biology, CBB326, ext. 4394. **Format:** **Online: Friday-Thursday, February 11-17.** Videos (asynchronous) on techniques and microscope basics. **In-person (all class): Friday-Saturday, February 18-19.** Lectures, preparation of samples, class tutorial on operation of microscope. **In-person tutorials:** 1 3-hour tutorial per student, scheduled **Sunday-Thursday, February 20-24.** **One evening live or ZOOM class presentation** of slides, scheduled sometime during week of **March 7-11.** **Limit: 6 students*.** **Prerequisites:** Biology 160 & 130 or 110 & 111 and one other upper-level Biology course with a lab; students with Biol 333 (Microbiology), Biol 319 (Molecular Biology), Biol 314 (Cell Biology), Biol 428 (SEM Workshop) or Chem 365 (Biochemistry) will be given preference. **Consent of instructor:** ssepsenw@uwsp.edu

* May be increased depending on Covid conditions.

TENTATIVE WORKSHOP SCHEDULE

Online (asynchronous): Friday-Thursday, February 11-17: short videos on transmission electron microscope "anatomy", glow-discharging grids, negative staining of viruses and bacteria, basic scope operation. **In-person, EM lab, CBB326: Friday, February 18 @ 1-6 pm and Saturday, February 19 @ 9am - 5 pm:** glow-discharging carbon-coated grids for the TEM; negative staining of viral and bacterial suspensions, brief lecture on ultrastructure of our samples. Demo of tissue ultra-thin sectioning for TEM. Class training in the alignment and use of the Hitachi TEM, training in the use of the AMT digital capture system. Creating **Photo Albums** in PowerPoint of TEM images for class presentation; creating explanatory slides. Sign-ups for tutorials; scheduling the class presentation. **In-person, EM lab, CBB326: Sunday -Thursday, February 20-24:** each student will have an individual 3-hour tutorial on the microscope, using student-prepared material and sectioned material. **In-Person or synchronous Zoom class presentation (depending on prevailing Covid conditions):** TBS during the week of **March 7-11:** one evening presentation by Workshop students. Afterwards, some Biology faculty may offer brief descriptions of their research projects that involve TEM that students might be interested in. **Covid precautions will be in effect.**